

# Exploring students' perception of the role of ICT in learning at a higher education institution

By



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Mini-dissertation accepted in partial fulfilment of the requirements  
for the degree *Master of Business Administration* at the North-  
West University

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## Declaration of work

I, Emile Jeremy Mather, declare that this mini-dissertation titled “**Students’ perception of the role of ICT in their learning at the North-West University Mahikeng Campus**” is my original work and it has not been submitted for any degree or examination in any other University or institution. I also declare that all other sources of information used in this dissertation have been appropriately acknowledged.

Signature:

Date: 30 November 2020

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## **Acknowledgement**

During this study, I received numerous support from various individuals who always been there to encourage me to carry on with my studies even through difficult times. I am forever grateful for the mentorship and support from my supervisors, Dr Martha Matashu and Prof Jan Meyer, for their advice and guidance, which led to the successful completion of this study.

I am grateful for this opportunity to further my career. I also appreciate the support from the IT department of North-West University, especially my Manager Justice Metswi, who is always willing to advise and support his department. Finally, I want to say thank you to my wife for her love and moral support. Above all, I give all praise and honour to our Lord and saviour Jesus Christ and am confirming that with God, all things are possible.

## **Abstract**

Over the past decades, Information and Communication Technology (ICT) systems have advanced, and the global complexion of the Internet has transformed how students interact and perceive the efficiency of ICT in higher education. ICT has changed teaching and learning industry that emerged as a new pedagogical approach. It helped shape teaching and learning in terms of development and delivery services. ICT adoption has immense benefits, but with poor planning and training will hinder students' from fully adopting these systems into their daily lives.

The aim of this study examines students' perception of the role of ICT in their learning at the North-West University Mahikeng campus. Research shows that there are fewer studies available on students' perception of ICT in their learning. By this cause, there are gaps created in the existing literature and motivated this study. A quantitative approach was used to determine the relationship between attitude towards use (U), perceived usefulness (PU), perceived ease of use (PEOU), external variables (EV), behavioural intention (BI) and actual system use. The aim of this study examined students' perception of the role of ICT in their learning using the Technology Acceptance Model (TAM). The data revealed that there is a significant correlation between variables U, PEOU, PU and BI that positively influence students' perception towards the use of ICT in their learning. However, the results show that EV does not have any significant correlation between ICT actual system uses. The conclusion was made that even though most students have a positive perception of ICT in their learning, there are other students who do not share the same view towards ICT in their learning. Generally, students' perception of the role of ICT in their learning was positive. The study recommends that a mixed-method approach can be used to replicate this study across-universities.

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# Chapter One

## 1.1 Introduction

This study aims to examine students' perceptions of the role of Information and Communication Technology (ICT) in their learning. According to Ankamah, Akussah, and Adams (2018:2) indicated that students perception and attitudes towards technology influence ICT adoption within academic institutions. ICT is progressively becoming vital in our everyday lives and our educational institutions (Charles & Issifu, 2015:1512). Integrating ICT within educational institutions plays a crucial role in teaching and learning (Ingutia-Oyieke, 2008:1). Davies and Pittard (2009) indicated that students are referred to as vital stakeholders. An insight into students' perception of the role of ICT in their learning is essential and is increasingly seen as necessary for improving students' use of ICT in their learning.

In the globalised economy, students' perception of the role of ICT in their learning has become a central issue of research on the incorporation of ICT in teaching and learning. For instance, Liton (2015) explains that students' perception is fundamentally essential for ICT adoption, which influences the effectiveness and implementation of ICT in education. Liton cited from Alipanahi & Iran (2013) conducted a study in Iran on students' perception of ICT; the study showed a positive attitude towards ICT in learning. Liton (2015) found that all teaching and learning endeavours filter through students' possible motivation. However, there are a few other components influencing students' perception and behaviour towards accepting ICT as a means for learning development, motivation, direction methods and capacities to use ICT technology in education, computer competence, and social perception of ICT and attribution to education.

A number of researchers provide evidence that ICT technology can improve learning in classrooms, and it has the ability for changing the way lecturer teach and students' learning (Ang'ondi, 2011; Thomson, Schmidt & Davis, 2003). The relationship between the adequacy of teaching, learning and the use ICT may also have been the motive for countries along with Australia, the United Kingdom, United States of America to incorporate ICT into their curriculum (Richardson, 2000; Tearle, 2004). ICT in learning in this digital era is of utmost importance to afford students the chance to learn and apply the skills required in the 21<sup>st</sup> century (Ghavifekr, Kunjappan, Ramasamy, & Anthony, 2016). Bhero (2012) underscores that technological advancement still falls behind in underprivileged townships and rural areas, although ICT is widespread in the commerce industry and higher education. Furthermore, students from schools in disadvantaged neighbourhoods tend to struggle at a higher education level, more so in an urban career perspective, due to their poor ICT education. In retrospect, these elements are barriers that can influence students' perception and the use of ICT in their learning environment.

ICT plays a significant role in learning because through e-learning, students can access quality education, educational software and World Wide Web (WWW), amongst others (Van de Bunt-Kokhuis & Sultan, 2012). The significance of e-learning allows a student to access teaching and learning from anywhere and at any time. Mlitwa and Koranteng (2013) indicated that with efficiencies of ICT and its continuous innovation in teaching and learning process, it would be expected that all students' within South African schools would benefit and have access to these efficiencies; however, this is not the case. Having access to ICT for teaching and learning is benefited and limited to advantage few in urban communities while students in disadvantaged communities are being robbed of a chance of gaining quality education (Mlitwa & Nonyane, 2008). Kladi-Kokkinou (2011) is of the view that ICT is considered to address educational shortcomings in developing countries. However, the inability to access these resources condemns the poor to continued poverty and illiteracy (Mlitwa & Koranteng, 2013).

Educators have made numerous assumptions about the relationships among ICT integration and student learning (Keengwe, 2007). This study aim is to investigate students' perception of the role of ICT in their learning; this chapter is structured as follows. The next section presents the background of the study and the problem statement in which the problem is clearly stated. The assumptions of the study, limitations, as well as the research questions and objectives, are subsequently dealt with. Henceforth, the centre of interest of this paper is to research students' perception and effectiveness of ICT in their learning.

## **1.2 Background to Study**

Globally, many universities are experiencing fast technological adjustments, continuous shifts within the learning environments and a new era of university students displaying various computer generational capabilities. New technology and the boom of virtual media are profoundly affecting current academic students (Liton, 2015). ICT is interwoven all through their lives. They cannot recognise their lifestyles without the Internet and grown-up amidst ICT as 'digital natives' when you consider their early childhood (Prensky, 2009). This trend requires cutting-edge expertise in ICT integration practices. Essentially, reinforces the integration of computer use into teaching and its relationship to students' learning (Liton, 2015). Research confirms that ICT can help students' in learning and aiding lecturers in teaching. However, there is no simple method of communication that is evident that ICT will make a difference by using it alone (Higgins, 2003).

Liton (2015) indicated that students are hardwired with multimedia and have evolved "hyperlinked minds". ICT allows students to analyse information while being far away from their computers and lecture rooms (Liton, 2015). Therefore, as a result on implementing ICT in educational, students and teachers could be benefited from available multidimensional resources that increase new

academic teachings and impact on students' learning as residents of the mediatised interconnected world. It is imperative to realise the perception of students who are the actual and top customers and beneficiaries of such a method.

Despite the perceived and proven benefits of ICT for students, Makura (2014) indicated that the uptake by the higher institution for teaching and learning has been below par. Czerniewicz, Ravjee, and Mlitwa (2006) argued that in South Africa, ICTs potential use to address teaching and learning needs is difficult to substantiate. Furthermore, arguing that this creates anxiety amongst some primary consumer such as students, but in the same context suggested that ICT was a useful approach in addressing persistent teaching and learning challenges. Such challenges were encompassing the diversity of students, large classes and the deep racial segregation stemming from apartheid legacy. Makura (2014) indicated that these challenges bred unpreparedness an ICT can be implemented within education in some ways. Integrating ICT in learning involves students' participation with the use of equipment; therefore, students must be able to utilise ICT equipment and have the opportunity to practise using computers in their learning, where support and guidance are generally at hand. Courses on campus can be supplemented with online interaction and courses on websites. Some modules are combined with classroom activities and online modules provided as blended learning (Wiyaka, Mujiyanto, & Rukmini, 2018). Furthermore, another module of the ICT program is virtual learning that can be used for different learning purposes. According to Wiyaka *et al.* (2018), the list of modules above are not mutually exclusive and can be implemented or combined within environments of any schooling institution.

There are numerous forms of disparities that countries are confronted with, and South Africa is not exempted. Unequal patterns of ICT technology is known as the digital divide, referred to as gaps that exist among users who can benefit and access diverse ICT technology and people who cannot (Russell & Steele, 2013:13). Furthermore, the digital divide is defined as uneven resource access, and wherein others are unequally acquiring benefits from computer-based ICT which in the end eventually leads to a society that is characterised with the aid of a class of losers and winners (Fuchs & Horak, 2008).

In South Africa, wealth disparity and income are recorded as high (Orthofer, 2016). According to Greig, Hulme, and Turner (2007:11) assert that disparity cannot only be restricted to different income levels or wealth; however, expands to differences in education, geographical areas as well as access to opportunities. Mbebe (2017) asserts that because of those disparities, ICT can be unequally accessed or adopted, and they too will cause a sort of division. Singh (2004:8) indicated that disparities would live on, and the digital divide is not the best undertaking; there are other demanding situations which seem more significant acute, inclusive of HIV/AIDS and

poverty. The researcher Mbebe (2017) has the same opinion with Singh in that there are different priorities, however, bridging the digital divide is likewise critical as each record and knowledge that can empower the people and remedy a number of those demanding situations

In Africa, several government organisations have embarked on the adoption of ICT in academic practices. The e-learning Africa document (2012) stated that most African countries had found many benefits in using ICT in teaching and learning, which include memory retention. The use of ICT in schooling policy was formulated and highlights the strong influence of the policies as they relate to ICT use for teaching and learning in schooling institutions for each of these countries. In Africa, a survey was conducted across 41 African countries, collaborating views on e-learning with regards to the impact and benefits of the use of ICT in learning (Africa Report, 2012). The report highlighted that ICT influenced students to learn, and made learning more fun; students understood topics better and were able to access study content online. Mandonga (2010) is of the view that ICT motivated students to be more engaged in the learning process when skills and concepts are supported with sound pedagogy and ICT. Bonde (2018) indicated that educational stakeholders in Zimbabwe embraced ICT after having seen its benefits and its potential for students in learning. As technology is entrenched within our culture, Maswetu (2010) suggested that students must be provided with relevant and contemporary experience in order for them to be successfully prepared for life after higher education.

In South Africa, students faced with disadvantage backgrounds are mainly from rural areas, where lack of essential needs are experienced. Between urban and rural communities, South Africa still faces discrepancies in education due to the post-1994 government (Koranteng, 2012). According to Mbebe (2017), geographically rural and urban areas are different from one another, meaning that students that reside in these areas require different needs due to challenges encountered. ICT is an essential tool for teaching and learning; generally, rural areas lag far behind on ICT development and its use in teaching and learning (Kah & Kah, 2008). Through sufficient support for ICT, adoption could support and facilitate effective teaching and learning in rural areas. Mbebe (2017) suggested that maintaining and effectively utilising these systems require skills and understanding. Although most educational institutions invest in ICT, which plays a vital role in education to advance teaching and learning, these administrators, lecturers, and students still have not entirely adopted these tools.

### **1.3 Problem Statement**

While there are various studies that explore factors which enhances ICT technology integration into teaching as well as barriers that affect technology integration. Fewer research studies are available on students' perception of the role of ICT usage and the impact of this perception on

students learning (Michael, 2016; Sikhwari, Ravhuhali, Lavhelani, & Pataka, 2019). Previous studies show that information collected concerning the impact of ICT in education; however, this information is often related to ICT systems rather than information that might help policymakers determine the potential impact of ICT on students learning (Marcino, 2018:30). Despite the availability of studies, there are few research studies that are available on students' perception of the role of ICT in their learning, in the context of universities in rural-based areas in South Africa. These results are similar to those reported by Makura (2014), which indicated that ICT usage by academics in higher education is low. Researchers are of the view that students do not use ICT in their learning successfully (Woreta, Kebede, & Zegeye, 2013). Ang'ondi (2011) advocated the reason for slow ICT in learning infusion proposed in the literature, are limited funding, inadequate development opportunities for teachers, negative attitudes towards technologies, and lack of students' perception. ICT is believed to have the potential to empower students and teachers, promote transformation and foster development skills; however, information that supports these claims are limited (Marcino, 2018:29). It can be inferred that it is critical to identify students' perception of the role of ICT in their learning in higher education. Against the backdrop, this study focus on investigating students' perception of the role of ICT in their learning at the North-West University Mahikeng campus.

## **1.4 The purpose of the study**

The purpose of this study is to investigate students' perception of the role of ICT in their learning at the North-West University Mahikeng campus.

## **1.5 Research questions and objectives**

### **1.5.1 Research question**

- What is the Students' perception of the role of ICT in their learning?
- What factors influence students' perception of the role of ICT in their learning?
- How does the perceived ease of use (PEOU) of ICT will affect students' intention to use ICT in their learning?
- How can the perceived usefulness (PU) of ICT affect students' intention to use ICT in their learning?
- What strategies can be used to improve the influence of students' perception to improve their learning?

### **1.5.2 Research objectives**

- To investigate students' perception of the role of ICT in their learning.

- To determine factors that influence student's perception of the role of ICT in their learning.
- To assess how the perceived ease of use (PEOU) of ICT will affect students' intention to use ICT in their learning.
- To identify how the perceived usefulness (PU) of ICT will affect students' intention to use ICT in their learning.
- To recommend strategies that can be used to improve the influence of students' perception to improve their learning.

## **1.6 Importance of the study**

The findings of this study intend to contribute to prior research knowledge on the efficiencies of ICT and the influence of students' perception to improve their learning and quality of education. These findings may be used for insight and understanding of factors and challenges that influence students' perception at the North-West University Mahikeng campus. This study intends to provide useful means for all stakeholders such as government and educational institutions in South Africa so that curriculum developers can address these issues. This study intends to address students' perception and the use of ICT in their learning, and to address factors that can influence their perception, and to provide strategies that can influence their perception towards improving their learning. Researchers can use the recommendations to further similar research areas. The purpose of this study findings is to add to preceding research knowledge.

## **1.7 Contribution and significance of the study**

Tagoe (2012) indicated that the use of the Technology Acceptance Model (TAM) was carried out in many universities and amongst students. However, fewer studies in South Africa have ventured into investigating students' perceptions of the role of ICT in their learning in Higher education. The results of having uneven ICT development in education systems are possibly exposed to learning difficulties experienced by students from disadvantage backgrounds entering University for the very first time (Bhero, 2012). The potential use of ICT creates anxiety amongst primary consumers, such as students (Makura, 2014). Jaffer, Ng'ambi, and Czerniewicz (2007) orated in a study done in South Africa that the potential use of ICT in teaching and learning is challenging to substantiate. However, the use of ICT strategy has the potential to address these challenges in teaching and learning. The significance and contribution of this study look at what is known and not known in the literature. This study aims to provide more insight on students' perception on the role of ICT to help university management, and stakeholders to understand how students' perception on ICT is crucial when incorporating ICT as an instrument for learning and what strategic guidelines will enhance teaching and learning in higher education.

## **1.8 Limitations of the study**

This study has several limitations that need to be addressed. The study examined factors that influence students' perception to improve their learning and the role of ICT at the North-West University Mahikeng campus. This study conducted a census on first year students in the Faculty of Economic and Management Sciences (FEMS) only. Due to the limitation of this study, future research can consider expanding the scope of the study by including other faculties and universities. This study intended to investigate students' perception and how ICT influence their learning; to some aspect, this study cannot be controlled by the researcher. The researcher anticipated that students are usually busy in order to participate. Students that participated were from Mahikeng campus only. Outside this campus is a limitation and does not generalise the views of others.

## **1.9 Delimitation of the study**

The delimitation of this study is the boundaries and scope of this study. The study focused on first-year students in the faculty of economics and management sciences (FEMS) only. Students from other faculties were excluded, including staff members, academic staff members and students from other campuses. However, there could be other factors that could influence students' perception and the use of ICT in their learning. Data was collected using a survey instrument that was distributed to students in the FEMS faculty.

## **1.10 Assumptions of the study**

This study assumes that all students that are willing to participate will provide honest and reliable responses. The assumption was made that all first-year students are familiar with ICT. It is also assumed that students will volunteer willingly to contribute to the research and that students will cooperate without any objections. Furthermore, it is assumed that there are ICT facilities available in order to conduct data collection.

## **1.11 Chapter layout**

**Chapter One: Introduction** – This chapter delivered an in-depth discussion of the overview of the study. This chapter discussed the introduction to the research topic; students' perception of the role of ICT in their learning and the background of the study. Chapter One, introduced the problem statement, the purpose of the study, research questions and the objective of the study.

**Chapter Two: A literature review** – This chapter dealt with the literature related to students' perception, factors that influence their perception, perceived usefulness of ICT technology, perceived ease of use of ICT technology in their learning and strategies that can be used to

improve their learning. This chapter sourced from various literature based on the Technology Acceptance Model (TAM).

**Chapter Three: Research methodology** – This chapter focused on the research design, philosophy, approaches, and all the method used for the collection of data and the procedures on analysing the information collected from participants. This chapter indicated the population size and the sampling technique used.

**Chapter Four: Data interpretation** – This chapter provided the interpretation of data collected from participants. The research findings were presented, interpreted and discussed in this chapter.

**Chapter Five: Conclusions and recommendation** – In the final chapter, presents the consolidation of the studies effects from which conclusions and recommendation were drawn.

## **1.12 Conclusion**

In Chapter One, the study viewed on the introduction, background of this study, the problem statement, and the purpose of the study, research questions and objectives, and the significance and contribution of this study. In the next chapter constitutes findings of other researchers that contributed to the literature on the use of ICT in learning, perceived usefulness, perceived ease of use, factors that influence students' perception and strategies that will influence students' perception.

## Chapter two

### 2.1 Literature review

This chapter views the literature on ICT that were published by other researchers. This chapter establishes what is known and not known in the literature about students' perception of the role of ICT in their learning. This study aims to investigate and to determine factors that influence students' perception of the role of ICT and to assess the perceived usefulness (PU) and perceived ease of use (PEOU) of ICT that will affect students' intention to use ICT in their learning; to provide recommendations of strategies that can be used to improve the influence of students' perception to improve their learning. In this section of the research, numerous sources are presented in various literature based on the foundation of this study.

Literature review in research looks at which surrounds a phenomenon under observation (Leedy & Ormrod 2014). This study drew on the Technology Acceptance Model (TAM) developed by Davis (1986) to understand the influence of students' perception of the role of ICT in their learning. Davis (1986) suggested that further studies ought to be undertaken to understand other components to extend the TAM model. It is crucial to examine the students' perception of the role of ICT in their learning. Students entering into University come from different backgrounds, such as rural schools and townships, research has revealed for more than a decade that the use of ICT in learning institutions significantly increase the potential of students learning, notably when it has collaborated with access to information, thoughts and ideas with the representation of students expression (Hennessy, Onguko, Harrison, Ang'ondi, Namalefe, Naseem, & Wamakote, 2010). The boom in the e-commerce industry will not depend on the actual development of ICT infrastructure; however, additionally on how much the population has acquired the ICT knowledge and competencies to use innovative technology. Therefore, the literature seeks to reveal how students perceive ICT and how ICT influence them in their learning.

Innovation intervention in teaching and learning accessibilities, experts, instructors, teachers and regulation pioneers are encountering students as dynamic learners instead of inactive buyers of information (Liton, 2015). This segment surveys the literature related to 'perception' factors in joining creative innovation in the classroom and its viability to the users of technology in higher institution. This evidence from the literature consequently shows that students are key stakeholders in higher education and that their perceptions play an important role in offering feedback to stakeholders and government. These statements should, in a manner, play a position in providing consumers insights into the integration of ICT. Similarly, stakeholders should consider students' perceptions inside the process of integration in order to stop "stunted growth" (Visser & Jain, 1997:21). This resourcefulness of students' perceptions, coupled with few research facts

available have primarily been carried out in the developed countries Ang'ondi (2011) and has supplied the foundation for this study within the South African context.

## **2.2 Students' perception of the use of ICT in their learning**

It is essential to comprehend how students perceive their own needs, a view that places the student at a pivotal point within the use of ICT. Through the means of ICT courses, students should be capable of maximising their experience and the use of technology systems; that even though scholars and stakeholders have properly prepared ICT planning for learning, students' perceptions must be pursued (Kennewell, Tanner, & Parkinson, 2000). Literature reviews several factors influence perception on the use of ICT in their learning. Against this background, the section that follows explores the various factors.

### **2.2.1 The impact of ICT in education**

It is undoubtedly that traditional means of teaching and learning has stood the test of time. The effect of ICT on traditional teaching has emphasised content material. Research indicates that for decades courses were transcribed around textbooks (Das, 2019). Lecturers have taught through lectures and presentations combined with tutorials and knowledge of activity designed to rehearse and consolidate the material. Modern-day settings are favouring curricula that promote overall performance and competency. The use of ICT has been proliferating in recent years. Consequently, as Das (2019) indicated, traditional methods of teaching and learning were demanding, and in order to balance it, ICT has changed the conventional method of teaching and learning; the whole academic system should be restructured.

Das (2019) is of the view that ICT has several benefits and the potential to transform traditional means of teaching and learning.

- ICT has the prospective to improve schooling system.
- ICT allows students to demonstrate accomplishment in ways which might not be imaginable with the traditional method.
- ICT may assist students in satisfying their urges of curiosity, innovation and productivity.
- ICT helps enhance the quality of education by facilitating new sorts of interaction between students and lecturers.
- ICT provides students and lecturers with new equipment that allow advanced teaching and learning.
- ICT improves the structure and quality of education by applying competency and performance-based approach towards ICT modules.

- Access to the online program any time convenient to the learner.
- Increase academic services and medium.
- It improves students in learning procedure through the availability of interactive academic material that increases learner motivation and facilitates the acquisition of fundamental skills.
- ICT makes education more accessible to everyone.

### **2.2.2 Autonomy in learning and students' perception**

The use of ICT has changed the role of students in the classrooms; this enabled them to exert more choices and directions on how they approach their studies as to where lecturers act only as a guide or moderator rather than an instructor (Bonde, 2018). According to Bonde (2018), the educational sector in the United Kingdom (UK) considered ICT as an essential tool for students to do assignments as work teams to achieve different goals. Underwood (2009) asserted that students undertake responsibility when they use ICT in learning, therefore making the use of ICT of crucial importance for students. ICT intrinsically empowers students to motivate themselves and pushed them to be more creative in their learning (Stevenson, 2008).

According to a study done by Bora and Teki (2013) in Mumbai, students' perception on ICT enriched course modules, determined that using ICT in the teaching and learning method was liable for numerous affective components such as students' usual attitude toward their studies, each positive as well as negative. Furthermore, the author noted that students' interpretations about ICT use within their studies spilt over to their perception of learning in general. By incorporation of ICT successfully in a course module is crucially relied on several factors inclusive of use of relevant ICT resources to offer hands-on activities for students, and instructor's skills in the usage of the ICT. Bora and Teki (2013), asserted that it enables effective learning if students are given the opportunity to familiarise themselves with ICT. The researchers found strong inter-dependencies among students' perception of ICT utilised in learning and their perceptions of conventional factors of the module, together with the instructor, and quantity of time students need to commit to the module. Research studies on the role of ICT within the teaching and learning process should bear in mind these kinds of factors in an ICT integration.

### **2.2.3 The benefits of ICT in learning**

According to Becker (2000), studies done in the United States (US) confirms that ICT improve students learning abilities. Furthermore, these findings indicated that students outperform classmates in a variety of subject areas, this includes problem-solving, and the ability to learn quicker using ICT tools compared to students using conventional methods of study. Bonde (2018)

is of the view that the use of ICT in learning influence students' self-esteem, encouraging students' cooperative learning, peer tutoring, and including other social skills. Furthermore, the author confirmed that the use of ICT assists student to master their skills needed to participate successfully within the workforce. Supported studies done by Muller (2009), stated that through ICT technology, students' improved collaborated learning, Group solving activities and project articulation.

Mdlomwa (2012), suggested in a study done in South Africa that ICT integrated within the curriculum will benefit students, stating that this will allow students to get exposure to develop skills and required edge as technology advances in the working environment. Secondly, introducing ICT into schooling curriculum allow students to be innovators of ICT. Furthermore, motivating students to use ICT will allow them to cultivate a culture of independent learning, teamwork, communication skills and research expertise which is essential in today's global society.

#### **2.2.4 ICT perceived to improve students' performance**

Several researchers have stated in their studies that ICT can effectively improve students ability in learning, performance, and improving the quality of higher education (Balanskat, Blamire, & Kefala, 2006). According to Balanskat *et al.* (2006), information was gathered on the advantages and benefits of ICT in schooling institutions. The study was measuring the impact and performance of students' use on ICT by establishing a link between ICT use and students results in exams. The results showed that ICT has a significant impact on students' performance. Bonde (2018) indicated that schooling institutions that are equipped with ICT resources achieve better results in comparison with schooling institution that is not well equipped. The author further stated that there is a positive correlation between students' performance and ICT. Harrison, Cavendish, Comber, Fisher, Harrison, Haw, Lewin, McFarlane, Mavers, and Scrimshaw (2001) conducted a comprehensive research study on the impact of ICT and students achievement. The study was expanded over three years. Evidence showed a positive relationship between ICT technology, students' learning and exam results. The study showed that by comparing students' that were computer literate, outperformed others that were not familiar with computers in the same vital modules. Earlier studies conducted by Ishaq, Azan, Zin, Rosdi, Abid, and Ijaz (2020) indicated that in the UK, ICT can improve and encourage the educational process, the wide range of use of ICT in education and has a great impact on students' performance. Bonde (2018) has stated that the European Nordic verified the benefits of deploying ICT has brought on students' performance, ICT is seen as a valuable tool by teachers to tailor learning for students who benefit both academically weak and robust students

### **2.2.5 Understanding students behaviour towards ICT**

Venkatesh, Rabah, Fusaro, Couture, Varela, and Alexander (2016) asserted that it is crucial to determine the added value of ICT technology in a higher educational setting and how students use ICT to support their learning. Furthermore, the study indicated that there is no one-size-fits-all solution or recommendation for integrating ICT into higher academic institutions. Prior research has found that electronic mail, internet and equipment such as computers are commonly used ICT in higher educational environment (Conole, De Laat, Dillon, & Darby, 2008). Students, for instance, perceive that using social media tools and browsing the Internet is beneficial as this assists them in their learning and allows them to explore beyond boundaries of a textbook (Tang & Austin, 2009).

Artino (2008) has illustrated that the combination of students' perceptions and motivation of quality training are good predictors of perceived effectiveness of online learning, hence the use of ICT in learning. Artino surveyed 646 participants selected from a United States (US) service academy, the use of a 48-item questionnaire concerning perceived online learning lessons. The findings revealed that 54% of the variance in students' perception of e-learning satisfaction might be defined by the impact of self-efficacy and perceived task value and perceptions of quality online learning.

In other studies, Kirkwood and Price (2005) investigated students attitudes concerning the incorporation of ICT in teaching and learning by examining research with a combined sample of 80,000 students from the campus-based Open University in the United Kingdom (UK). They observed that students are willing to adopt the use of ICT in their learning after they understood and internalise why the equipment is useful to them in that precise instance. This could suggest that selecting from a prevailing pool of ICT programs; students need to understand the use of ICT in their learning and how it will benefit them in that particular situation and the best ways to use/operate ICT systems. Venkatesh *et al.* (2016) indicated that students' choice to use ICT is proportional to its perceived benefit and the time invested in learning to use ICT.

Goodyear, Asensio, Jones, Hodgson, and Steeples (2003) conducted a survey study on 178 undergraduate students, and the students completed the survey amended from ETWISTLE and RAMSDEN (1983), the study investigated the relationships between students' attitudes towards ICT based learning (e.g. e-learning) and methods of studying. Students were invited to categorise their approach to learning and requested their perceptions of ICT based learning, a term utilised by the authors to indicate the use of ICT in learning to improve interactions among all stakeholders involved. The outcomes suggested that students' perceptions in their very own approaches to

learning did not affect their perceptions of ICT based learning. The study recommends that research should address the instructional design and students' understanding of ICT based learning. Students may understand their learning approach; however, not knowing the role of ICT in their learning may also have an impact on pedagogical methods.

Edmunds, Thorpe, and Conole (2012) researched students' perceptions of ICT use and how it differed across educational, social context and work environments. The sample comprised of 421 participants enrolled in 6 different technology integrated courses in the UK. Participants were examined through a questionnaire established around the TAM, developed by Davis (1989), which associates user acceptance of ICT equipment to perceived usefulness and perceived ease of use. Findings showed that usage proficiency and perceived benefit explained variance in students' attitudes toward using ICT and how they are deployed in diverse settings. Furthermore, the authors indicated that earlier experience appeared as a predictor for perceived ease of use of ICT. Students at varsity level started becoming aware of the benefits of ICT technology, besides completing classwork successfully, but for their survival within the modern-day complex work environment (Conole *et al.*, 2008).

It is clear that ICT has a significant impact on students' behaviour and how they perceive ICT in their learning. However, research also shows that if students understand how to use these innovative technologies, it can benefit them immensely in their careers and their learning. The next discussion looks at internal and external factors that can influence students' perception of ICT in their learning. Internal factors are seen as availability of computer/laptop for students, adequate training for students on ICT equipment, and how lecturers interact with ICT in classrooms and how do they interact with students. External factors are seen as prior experiences and exposure to ICT, availability and accessibility of infrastructure such as electricity, internet connectivity in rural communities that affect students entering universities to further themselves academically.

### **2.3 Factors that influence students' perception of the role of ICT in learning**

It has been debated that the decision to use ICT is neither a treatment for challenges in educational situations nor a solution for educational reforms; however, it can be seen as a tool to guide learning and enhance the quality of higher education (Makoe & Nsamba, 2019).

Certainly, ICT has to be related to the learning contexts of the student and ought to be needed by students themselves (Glatthorn, Boschee & Whitehead, 2006). Deaney, Ruthven and Henessy (2003) present arguments to emphasise that students are an essential part of the social system and that their perception plays a crucial function in the formation of schooling activities. It is crucial

for Stakeholders to note the views and opinions of students (Keys & Fernandes, 1993). This will help in understanding what the students consider their experiences are and what they distinguish between being of significance in their learning, which in turn will lead to excellent performance.

### **2.3.1 Factors influencing the use of computer systems**

From a teaching and learning perspective, it is important to comprehend how students are making use of ICT and how ICT can enhance their learning experience (Kirschner, Wubbels, & Brekelmans, 2008). The fast increase in ICT has been followed by the ability for such systems to convert the classroom setting, and it has brought on attention to how ICT can facilitate student engagement and learning (Kirschner *et al.*, 2008). There might be some discrepancy among students' being taught and ICT skills in schooling institutions, and the literacy competencies needed to function outside the schooling system (Mioduser, Nachmias, & Forkosh-Baruch, 2008). Research shows that ICT is predominantly used within the work environment, and the level to which students are gaining appropriate competencies in ICT, whether those abilities are attained in schooling institutions or elsewhere is vitally important (Kirschner, Sweller, & Clark, 2006). A key focus related to the use of ICT in higher education is the level to which such systems can capture students' engagement and attention with educational material.

Scholars have indicated in their research why it is necessary to incorporate ICT in educational systems (Hawkrigde, Jaworski, & McMahon, 2016). Hawkrigde *et al.* (2016) suggested that there are four rationales for the use of computer systems in schooling institutions. The authors categorise them as pedagogical, catalytic, social and vocational. The pedagogical and catalytic rationale pertains to the increased use of ICT on students and teachers in teaching and learning practises. The social and vocational rationales are factors to improved use of ICT in all spheres of human activities in society.

Hernandez (2017) stated that using ICT in education has increasing importance in the educational environment. The author observed that technological tools, such as ICT in education is an increasing on-going reality in society, as a result, expansion to embrace educational institutions, students and teachers will bring about optimisation of the teaching and learning practice. For example, the use of technology innovation is driven structures in universities to include automating services in schooling library (Keiyoro, 2010). In this social context, computer systems are neutral technical means of attaining a described purpose in the educational system (Keiyoro, 2010). The contexts expressed by Hawkrigde *et al.* (2016) support rationales for the implementation of ICT in schooling institutions and their use in teaching and learning means.

Keiyoro (2010) is of the view that technology has evolved in ways to simplify and resolve problems associated with human needs in more productive means. The implication is that if there is no issues/problems to resolve, then ICT will no longer be developed or be tailored to suit specific needs. When this precept is applied to educational systems, this indicates that educators need to adopt ICTs that will address pedagogical difficulties/problems. Furthermore, students would not adopt ICT technology if there is no usefulness or any gain in productivity.

At a higher educational level, the question arises as to whether or not the use ICT resources to be used in universities are correctly utilised to offer the best educational opportunities to students on campus. It becomes more of a question of students' perception, a balance between inputs (ICT resources) and outputs (students learning outcomes). Investing in ICT might also suggest less investment in other assets such as books, lecturers and infrastructure. However, it is arguable whether or not the uses of ICT systems as teaching equipment provide higher studying results than the equivalent funding in other conventional/traditional learning methods (Keiyoro, 2010). In the event that they do, what level of investment in ICT systems as compared with other resources would provide the best outcome for students? According to Keiyoro (2010) indicated that very few educators and educational commentators could recommend no funding in ICT systems, even though they were for rationale literacy. Bonk (2001) argues that few educators advocate for an investment in schooling that supports all teaching and learning being conducted electronically, such as online learning (e-learning).

### **2.3.2 Lecturers incorporating ICT in classrooms**

Despite the presence of computer systems at universities everywhere, Bhero (2012) argues that computer-aided teaching is not fully adopted. The author stated that in the Cape Peninsula University of Technology, the use of the traditional board and chalk approach continues to be familiar to cater to students with weak computer skills or abilities. (Pineteh, 2012) indicated that these students were found to have low academic insight and the sense of dedication as well as cognitive development to compete with their counterparts in classrooms. Furthermore, the author advocated that it is discouraging to have low computer skills because university students frequently fail to come to terms with complexed information from the Internet.

Experience in computer systems enables end-users to demystify Information Technology (IT) and removes the fear in using these systems (Bhero, 2012). Formal teaching in students can only effectively take place in primary schooling as part of the instructional curriculum. However, in retrospect, schools in rural areas in South Africa are below-resourced. Hence, students coming from deprived township and rural schools lack self-esteem and confidence as compared to students from well-resourced public faculties which they acquire (Books & Ndlalane, 2011)

According to Van der Berg (2008) indicated that rural schools or disadvantaged communities do not lack resources only but qualified educators as well. The importance of computer skills among teachers themselves and the practical use of a computer is essential in the educational environment. Rural school faculties do not revel in the same material and pedagogical skills available to urban schooling faculties (Shraim & Khlaif, 2010).

### **2.3.3 ICT in rural communities**

In other studies, there were three other factors identified that influence user's perception of ICT such as attitude, self-efficacy, and subjective norm. Luarn and Lin (2005) indicated that a person attitude displays whether a person has like or dislike towards something. A positive attitude is vital and is seen as an essential component that a person should have when using ICT (Hassan, Samah, Shaffril, & D'Silva, 2011). Shiro (2008) is of the view that in a rural community, users are keen on using ICT, and they want ICT projects in their communities. However, Shiro (2008) argues that even though they have this form of positive mind-set towards ICT, lack of ICT information and skills have obstructed them from using ICT frequently. Zhang and Aikman (2007) suggesting that continuous utilisation and exposure to ICT should be emphasised if the positive mind-set towards ICT utilisation is to be cultivated in various rural communities. As stated in the above study, these are factors that students are faced with in rural areas, putting students in a disadvantage position entering universities compared to their counterparts that are from rural settings. Students in rural setting should be exposed to ICT from an early age, this will increase students' confidence and self-esteem.

Furthermore, consistent with Dixon (2009), exposure to ICT and continual use will create a professional user on ICT. Yi, Wu, and Tung (2005) suggested that character differences might be a critical factor to shaping a positive mind-set toward ICT utilization; users having different genders, age and location will have distinctive mind-set and perception towards usage on ICT. Rural community and townships are usually related to a negative attitude in the direction of ICT usage in comparison to their counterpart in urban communities. However, Duan, Warren, Lang, Lu, and Yang (2008) argues that experience and knowledge do play a role in individual attitude towards using ICT. The lack of awareness on using ICT might keep individuals in rural communities away from the ICT services inclusive of Internet and telecommunication, and this immediately might create users' poor mind-set towards ICT. Furthermore, some users experience anxiety, and this can be identified as one of the factors for users resistance to using ICT (Russell & Bradley, 1997).

### **2.3.4 Self-efficacy and subjective norm**

Abdullah and Ward (2016) indicated that the most widely use variable in the extended TAM is computer self-efficacy. Hosseini, Bathaei, and Mohammadzadeh (2014) argued that self-efficacy is an important aspect in influencing information sharing in ICT systems. Hassan *et al.* (2011) are of the view that self-efficacy is a user's belief that he/she perceived to do a particular activity successfully. Several research scholars revealed the impact of self-efficacy on one's ICT utilisation (Johnson & Marakas, 2000). Self-efficacy is considered as one of the reasons that had a dominant contributor to ICT utilisation (Venkatesh, Morris, Davis, & Davis, 2003). However, some studies disagreed on findings on the studies as mentioned above, referred that there is an insignificant correlation between ICT utilisation and self-efficacy (Bolt, Killough, & Koh, 2001; Gallivan, Spitler, & Koufaris, 2005).

The second one most widely used variable in the extended TAM in the area of ICT is subjective norm (Abdullah & Ward, 2016). According to Venkatesh and Morris (2000) argue that subjective norm is a person's perception that he/she should or should not perform the behaviour to accept the use of ICT simply. Previous studies found that subjective norms influence the use of ICT in rural communities (Ibrahim & Ainin, 2009; Pee, Kankanhalli, & Show, 2010). According to Gilligan (2005) found that the effect of subjective norm on ICT utilisation in rural communities is that in these areas people use the computer less because of being surrounded by people who use computer/laptop less, and lack of resources such as ICT infrastructures which can be the reason why fewer people are interested in using ICT technology.

### **2.3.5 Infrastructure in rural areas**

A student must have some form or level of computer knowledge to endure their years at universities where in ICT systems has grown to be a norm (Bhero, 2012). All procedures from communication and teaching in classrooms are shifting to digital mode (Boulton, 2008). MacGregor (2008) advocated that in South Africa, almost all universities have adopted some form of e-learning modules that are available facilities to specific institutions. Primarily, e-learning is used as a form of blended learning and where student-to-lecture and student-to-students communication is enhanced (Bhero, 2012). The University of South Africa (UNISA) makes use of e-learning to facilitate collaboration with students online and to distribute resources (MacGregor 2008). However, students that are living in remote areas experience challenges such as weak ICT skills, and because of lack of resources, students experience bad network connectivity and low bandwidth in rural areas (Bhero, 2012).

Furthermore, the lack of appropriate ICT infrastructure had deprived many poor rural and township communities. In order for telecommunication systems to function, electricity is needed.

The Internet and computer systems are driven using electric power. Bhero (2012) in most rural areas, users do not have electricity, making it virtually impossible for the user to use computer systems and connecting to the Internet. In the next discussion, the study looks at the Technology Acceptance Model (TAM) concept, perceived usefulness (PU) and perceived ease of use (PEOU).

## **2.4 Influence of perceived usefulness (PU) of ICT in learning**

The technology acceptance model (TAM) concept of Davis (1989) is beneficial to give an explanation for the usage behaviour of Information technology (IT). The concept changed or build upon Fishbein and Aizen (1975) the concept of reasoned action that says that beliefs ought to influence attitudes, which result in purpose to use and finally, utilisation behaviour. Considering the underlying relationship could assist us to understand the use of ICT and students' adoption behaviour.

Hayashi, Chen, Ryan, and Wu (2020) asserts that PU is the belief that an individual has that a particular system might improve his/her process performance (i.e., accomplish a task faster or providing timely data). Davis (1989) asserts that perceived ease of use (PEOU) is someone who believes that the use of a specific system could be free of endeavour. TAM has two other constructs in which are a personal attitude to use and behavioural aim to use (Hayashi *et al.*, 2020). The author asserts that attitude to use is the consumer's evaluation of the desirability of employing specific information systems utility. Furthermore, the behavioural to use goal is to apply a measure of the probability that a person will use the system.

According to Huang, Teo, and Scherer (2020a) researches have tried to unfold factors that have influenced students' intentions towards using ICT throughout cultures, consisting of computer self-efficacy and facilitating conditions Teo (2009), technology complexity (Khlaisang, Teo, & Huang, 2019), and subjective norm.

Previous studies have extended factors in the TAM, especially PEOU and PU, which are two original variables in the TAM (Huang *et al.*, 2020a). Furthermore, the author identified that these variables are the most influential experiences of users' attitudes and intentions to use ICT for learning (Nagy, 2018; Teo, 2016). Abdullah and Ward (2016) asserted that the validity and explanatory of the TAM were broadly mentioned and used in educational institutions.

Perceived usefulness calculates or measures the level to which consumers perceive the usage of ICT is useful, and PEOU suggests the level of effort consumers need to make (Davis, 1989). Huang *et al.* (2020a) indicated that given the relevance of PU for ICT acceptance, research has concentrated on the function and understanding of those concepts. Huang, Teo, and Zhou

(2020b) indicated that the structure of PU has been widely explored in academic environments and has proved to be reasonably steady among students.

## **2.5 Influence of perceived ease of use (PEOU) of ICT in learning**

Davis (1989) indicated that PEOU measures the degree to which someone believes that the usage of a system is effortless in attempt to use. In an educational context, students' in universities typically experience difficulties in their studies when performing numerous tasks and assignments in their learning in diverse subjects (Huang *et al.*, 2020a). Therefore, as indicated by the author, it is reasonable to assume once students' perceive using ICT to be an effortless attempt to use, they would be influenced to use ICT in their learning. In this manner, the role of ICT in education procedure would be made distinguished. Alternatively, if students perceived using technology to be exhausting, they'll avoid the usage of them altogether regardless of the benefits of ICT might also convey to their learning.

PEOU is widely taken into consideration as a fundamental determinant, an individual's attitude and PU in a wide variety of technology acceptance studies performed in distinctive contexts and cultures (Huang *et al.*, 2020a). For instance, the author indicated that PEOU was found to have a notable influence on teachers' perceptions of usefulness in terms of mobile technology in Spanish pre-service (Sánchez-Prieto, Huang, Olmos-Migueláñez, García-Peñalvo, & Teo, 2019). Furthermore, in both Singaporean and Thai, in South-East Asian culture, pre-service teachers advocated that their attitudes towards ICT use have been significantly influenced by PEOU (Khlaisang *et al.*, 2019; Teo, 2009). In the East Asian region, PEOU had extensively motivated Chinese students' perceptions of usefulness and their attitudes towards the use of ICT in their learning (Huang *et al.*, 2020a).

In an educational context, PEOU has been broadly adopted in the research of educational technology acceptance (Huang *et al.*, 2020b). Huang, Huang, Huang, and Lin (2012) observed that PEOU in Taiwan had a high-quality and significant impact on university students' attitudes and towards ICT use for English learning. In Brazil, PEOU became substantially associated with students' attitudes in the direction of using an internet-based learning system (Moreno, Cavazotte, & Alves, 2017).

## **2.6 Strategies that will influence students' perception of the use of ICT**

Ishaq *et al.* (2020) indicated that the effect and practices of ICT have become a growing area of discussion in all the areas, especially in an educational environment. Furthermore, lecturers are using ICT to adapt to pedagogical methods in order to increase students' performance. Lohnes Watulak (2012) suggested that to bridge the gap, universities should provide compulsory

computer training for undergraduate students entering university to improve their computer skills. However, Bhero (2012) argues that once people have a negative attitude and culture towards ICT, it becomes difficult to change their mind-set. In this discussion, we look at how students perceive technology and strategies that can influence their behaviour in learning.

### **2.6.1 The digital native and digital immigrant**

The term 'digital natives' was coined by Prensky (2001), to describe students with extensive knowledge of ICT, communicate the 'digital language' of computer systems, such as the internet and video games. Prensky (2001) indicated that these 'digital natives' have fundamentally different ways wherein they receive information and use ICT. The likelihood that student would receive information would be instant, choosing to acquire data quickly while enjoying multitasking instead of focusing on one task at a time. Their method of learning is probably to be characterised through a speedy trial and error method in place of a systematic assessment (Jukes & Dosaj, 2005). Prensky (2001) argues that by maximise students' attention and effort, the information should be presented in such a way that suits this approach, and that is in all likelihood to involve ICT.

In contrast to digital native, the 'digital immigrant' is users that learnt digital technology skills later in their life and preferred to access information reasonably from limited sources (Jukes & Dosaj, 2005). Kirschner *et al.* (2008) argue that these differences in learning approach have implication in interaction from both generations in the schooling environment. Given that many lecturers are digital immigrants, lecturers may also find it hard to present material to students in a manner that will engage them (Jukes & Dosaj, 2005). However, Jukes and Dosaj (2005) suggested that potential strategies to solve this issue are to present information through different media platforms, increase the speed on how information is presented to students, involve interactive learning and multitasking. Prensky (2001) is of the view that information presented through ICT medium, lecturers should speak a language that will inspire students in classrooms to encourage them to recognise the concept that they are presenting. However, Prensky (2001) argues that the use of ICT in classrooms may promote students effort in learning with new materials, it is yet indefinite whether or not corresponding will increase in overall performance related to the use of such technology.

### **2.6.2 Academic Teaching and learning methods**

University students revel in many educational uses of ICT, seeing that they promote their access to facts related to the course and also since they allow collaboration and communication with teacher and students (Venkatesh, Croteau, & Rabah, 2014). Furthermore, the author asserts that the usage of available ICT and integrated platform with regularly up to date course materials

appears to be conducive to student learning which includes coaching strategies, online lecture notes, and complementary websites.

However, it seems that there are academic practices which are less favourable to student learning. Venkatesh *et al.* (2014) indicated that these practises include PowerPoint slid shows that are wrongly used, unrelated web sites or too much content, and mandatory participation discussion in classrooms. Therefore, the use of ICT by the lecturer is a critical contribution to university students' in their learning, but how it is used is essential. According to Sharpe, Benfield, Roberts, and Francis (2006) indicated that in a study 300 students were evaluated and the effect of blended learning on university students revealed that scholars tend to respond in an overwhelmingly positive style to the combination of ICT in classroom and learning.

Although students do appreciate the usefulness of ICT with face-to-face teaching, there is a need for students to realise the role of ICT embedded in classroom settings and the corresponding affiliation of that on their study approaches and their engagement in numerous pedagogical activities (Venkatesh *et al.*, 2014).

Makura (2014) is of the view that many South African higher schooling strategic plans advocate ICT access and use while maintaining the human element through the lecturer's position. Furthermore, indicating that there are four models suggested by Mhlanga (2006), which is the replacement, emporium, supplement and the buffet model. The first three models use conventional methods of teaching and learning strategies with on-going supplementation with ICT interactive strategies. The buffet model, on the other hand, advocates a thorough shift towards overall adoption of ICT teaching methodologies that considers students' learning approach. This strategy has allowed students from this approach (Makura, 2014)

Research has indicated over the years that a technique conducive to learning is useful when learners adapt to a situation based on individual preferences for studying strategies (Biggs, 1979; Marton & Säljö, 1976; Ramsden, 1992). Moreover, research literature describes levels of learning (e.g., deep and surface learning), where the former describes an invested technique to information and absorbing supplied content, even as the end describes a way that intends on absorption for the functions of carrying out unique learning tasks (Entwistle & Ramsden, 1983).

### **2.6.3 Virtual learning environment (VLE)**

Annansingh (2019) is of the view that the usage of a Virtual Learning Environment (VLE) is more and more gaining popularity with universities among students and teachers. VLEs are stated to surge in flexibility and promote independent learning. However, the pedagogical consequences and the contribution of teachers in students revel in cognitive active learning in these online

lecture rooms is well worth investigating (Annansingh, 2019). Jain (2015) indicated that the VLE is designed to aid teaching and learning activities throughout the Internet. Annansingh (2019) indicated that personal computing devices and the Internet have not only transformed the world but transformed the way students engage in their learning.

According to Rogers (2004), the Virtual Learning Environment (VLE) of Web course tools (CT) learning platform can simulate that procedure. The author indicated that WebCT is not without shortcomings; however, it provided a conferencing facility that will allow students to summaries and comment on question and problems on a thread in both small and large groups as the course unfolds. It is clear that a learning environment that exercises around a subject context have a powerful effect on a learning outcome. However, the experience of this assignment confirms that students' perceptions of learning purpose and value articulate learning objective, exert the most substantial influence (Prosser & Trigwell, 1999). Therefore, this study started not with the subject context but with a discussion of the way students perceive the role of ICT and their methods of learning. Students acknowledged that learning involved the acquisition and communication of teachers as an expert and through literature; however, majority of students motioned that expertise need to involve personal construction and personal meaning such as deeper learning and understanding that VLE provides (Rogers, 2004). According to Venkatesh *et al.* (2014) research has investigated the claim that ICT provides in learning quality, sixteen university students were offered to participate in a WebCT-course module; the mixed methodology study argued that ICT provides deeper learning as opposed to surface learning. Results also indicated that students are more ease in expressiveness, immediate feedback, communication facilitation and problem resolutions (Rogers, 2004).

According to Venkatesh *et al.* (2014) indicated that several research studies had indicated the importance of students' perceptions of the effectiveness of ICT usage in academic classrooms. Students regarded classroom presentation as a beneficial ICT tool on the subject of its tremendous effects on motivation and learning (Tang & Austin, 2009). Research indicated that there is a positive change in practical activities, multimedia instructions and oral feedback on presentation skill attainment (De Grez, Valcke, & Roozen, 2009). Students can make use of productive ICT applications and equipment to prepare presentations, create word documents or graphs. Higher academic students make use of writing or doing assignments using Microsoft Word, Spreadsheets and PowerPoint for presentations. Venkatesh *et al.* (2014) suggested that Virtual Learning environments (VLEs) are specifically beneficial to academic students because it can keep them up-to-date with classroom content such as online videos, resources, communications, and postings which gives students flexibility in terms of finding relevant content for course information and accessibility (Conole *et al.*, 2008).

Venkatesh *et al.* (2014) argue that millennial students are characterised for their efficient usage of ICT technology. Students can determine for themselves, which ICTs that suit their specific needs as academic learners (Conole *et al.*, 2008). As a result, students will set up their online learning networks and prefer those to discussion mediums created through their lecturers (Venkatesh *et al.*, 2014). Additionally, while universities may invest heavily in adapted VLEs, students are selective in terms of which ICTs they use and their time using these systems (Conole *et al.*, 2008). Venkatesh *et al.* (2014) argues that students take into account the use of ICT, as pivotal, in their learning trajectory. Besides, using ICT tools to communicate outside of the lecture rooms, it is an absolute necessity in the life of a current modern-day student. Moreover, the use of ICT systems permits students to communicate with one another (e.g. Emails, Skype and WhatsApp), with lecturers, and beyond physical boundaries and limitations of classrooms. Messaging software program such as Skype were the most frequently said communication platforms (Conole *et al.*, 2008).

#### **2.6.4 Students engagement in blended learning**

McCann (2019) advocated that there is much research on blended learning and students' engagement around students' perception, and their successful engagement on blended learning concept. Akyol and Garrison (2011) conducted a study on 27 graduate students to determine the relationship between blended learning and students' perceived learning outcome. These students were separated into two groups, one group received course material on a fully online platform, and the second group completed a blended learning course platform. The results of the observed study confirmed that students using the blended learning platform had higher perceptions of learning, course satisfaction, teaching presence, cognitive presence and social presence (Akyol & Garrison, 2011).

In similar fields of study, Hiralal (2012) observe a study on 55 undergraduate students at the University of South Africa (UNISA). The study aims to determine students' perception and their experience in blended learning. The study observed that 42 out the 55 participants strongly agreed that blended learning motivated them in their learning, representing 76% of the total sampling group and only nine agreed. On the other hand, it should be noted that none of the respondents strongly disagreed which may also motivate that blended learning may have a massive effect on students' motivation on learning

In other studies, Asarta and Schmidt (2017) conducted experimental research observe 604 undergraduates in numerous sections of an introductory business class at a public university in the United States. The study examined whether or not the success in blended learning correlated

with students' previous academic success. The preparation was on the spectrum of blended learning but toward more an online aspect as opposed to the face-to-face aspect (McCann, 2019). Asarta and Schmidt (2017) indicated that lectures were only accessible online in the form of narrated PowerPoint slides. The study concluded that students that had low-grade average performed significantly better in traditional course methods of teaching. Students that performed significantly well within the blended learning achieved a high-grade point average. However, there was no significant difference in performance detected in the middle region of grade point average (Asarta & Schmidt, 2017). McCann (2019) indicated that students' perception of blended learning improves their understanding of course modules.

Hiralaal (2012) surveyed students in an accounting course using blended learning; 48 out of the 55 participants strongly agreed that blended learning assisted them in acquiring a deeper understanding of the procedures and accounting standards. The study observes that 87% strongly agreed from the total sample group, six respondents agreed.

In light of the above research studies, it is clear that ICT has a significant impact on students and how they perceived technologies in their learning outcome. Research shows that if there is a balance (e.g. blended learning), prior training and exposure on ICT will create a conducive environment for all students giving them an equal opportunity compared to their counterparts on campus. Therefore, this has to be taken into consideration while designing bridge schooling to aid incoming students into universities in the South African schooling system.

## **2.7 Technology acceptance model (TAM)**

Researchers over the years have determined the acceptance and adoption of technology in several areas of information systems using the Technology Acceptance Model (TAM). In a study done by Amoako-Gyampah and Salam (2004), examined the implementation of Enterprise Resource Planning (ERP) using the TAM. The study added other variables to extend the TAM during the implementation of the technology, such as training and communication, shared belief, perceived ease of use (PEOU) and perceived usefulness (PU). The researcher suggested that the theoretical framework on the distribution of innovation and perceptions of the individual usage of technology will influence their behaviour on the adoption of technology. Amoako-Gyampah and Salam (2004) indicated that PU and PEOU in the TAM are proven to be the significant determinants on an individual's use of technology systems. The study was conducted on a global organisation level, although the use of the TAM theory is applied to an individual level.

In other studies, Chen, Shing-Han, and Chien-Yi (2011) used the TAM theory to examine the past, present and future trends in a tertiary hospital. This study was conducted in Hong Kong to

determine technology adoption by physicians using the TAM. The study reviewed twenty-four different studies that used perceived ease of use (PEOU) and perceived usefulness (PU) to determine the understanding of technology adoption and behaviour of individuals. (Chen *et al.*, 2011) advocated that these two variables could predict an individual's attitude concerning the use of ICT.

Furthermore, the study revealed that to motivate behavioural intention to use ICT, an individual need to cultivate a positive mind-set towards the use of technology. (Chen *et al.*, 2011) the study concluded that TAM theory helps recognise and provides useful understanding and explanation on the behavioural intentions and implementation of information systems.

### **2.7.1 A meta-analysis on the TAM**

King and He (2006) adopted the meta-analysis studies method on TAM. According to King and He (2006) advocated that meta-analysis is a statistical literature synthesis process that provides the research context by using analysing and combining the quantitative results of various empirical research. The study identified elements and factors that give reason to individuals accepting and using information systems and other theories that recommended to address the challenges. King and He (2006) referred to theories proposed by Davis (1989) identified the variables in TAM behavioural intention, perceived usefulness and perceived ease of use. King and He (2006) advocated that the TAM is easy to understand and widely used model in various studies in information systems. Furthermore, King and He (2006) compiled 88 empirical research studies on TAM from several research publications and concluded that TAM is a powerful and robust predictive model for examining individual perception and adoption on information systems.

### **2.7.2 Students perception and the use of TAM**

Several variables can influence students' perception of the role of ICT in their learning in higher educational settings. Keller and Cernerud (2002) identified several variables such as age, gender, and prior computer experience, individual learning style and technology acceptance as predominant predictive factors when discussing students' acceptance of ICT. Tagoe (2012) indicated that there are various theories of technology acceptance used to understand the perceptions of students. The TAM was developed by Davis (1989), which was built upon the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1977). This theory was used to identify individuals' belief that influence their attitude, lead intention and actual use behaviour. The TAM as proposed by Davis describes that someone's behavioural intention to use ICT in their learning is determined by perceived ease of use (PEOU) and perceived usefulness (PU) (Mahdizadeh, Biemans, & Mulder, 2008).

Although, the ultimate purpose of the TAM is to determine the actual usage. This theory could be used to understand why an individual may accept or may not accept ICT in their learning (Jung, Loria, & Saha, 2008). In this study, external variables are seen as predictive variables to determine students' perception of ICT such as infrastructure, prior computer experience and ICT training. These variables have been described by other researchers using the TAM model as external variables (Tagoe, 2012). To this study, prior experience is seen as a crucial variable to implement ICT in students learning. Prior technical competencies or computer skills can be influenced by age, gender and can influence intention to use ICT (Pituch & Lee, 2006). Individual such as students will use ICT if they perceive that ICT will enhance their overall performance (Saade, Nebebe, & Tan, 2007).

The Technology Acceptance Model (TAM) was proposed by researchers to determine the acceptance of ICT among students in many universities (Tagoe, 2012). However, in South Africa, only a few research studies have been done explaining why students may accept ICT in their learning which may impact teaching and learning in higher education. This study aims to provide more insight on students' perception on the role of ICT to help university management, and stakeholders to understand how students' perception on ICT is crucial when incorporating ICT as an instrument for learning and what strategic guidelines will enhance teaching and learning in higher education (Park, 2009).

This study will draw from the technology acceptance model (TAM) proposed by Davis (1986) to understand students' perception of the role of ICT in the learning. Davis (1986) asserted that further research should be done to identify other relevant components to extend the TAM model. The TAM was extensively used in various studies to predict individual adoption of ICT systems. However, it is clear that the TAM model developed by Davis (1986), will be a suitable model for this study to examine students' perception of the role of ICT in their learning at the North-West University. In the next discussion, the conceptual framework will be introduced.

## **2.8 Conceptual framework**

Students' perception of the role of ICT in their learning in university schooling can be influenced by several factors. Keller and Cernerud (2002) have diagnosed variables which includes previous computers experience, gender and age, acceptance of technology and individual styles of learning as essential predictive elements while arguing acceptance of technology by students. Tagoe (2012) is of the view that there are many other theories on technology acceptance used to understand the perceptions of students. Among such theories is the technology acceptance model (TAM), which was developed by F.D Davis in 1989 on how to solve problems of technology

system adoption (Obinkyereh, 2015). Preferably one would use a model not only for prediction but also for clarity and explanation, in order that practitioners and researchers can become aware of why a particular device can be unacceptable, and pursue proper corrective steps (Davis, Bagozzi & Warshaw, 1989).

Furthermore, the fundamental purpose of TAM is to provide a source for tracing the impact of external elements on intentions to use, attitude and inner beliefs. TAM was used to identify and clarify perceived usefulness (PU) and perceived ease of use (PEOU) regarding an individual idea or intention to use these technology systems (Dawson, 2015). The TAM, as proposed through Davis, narrates that a person's behavioural purpose of using ICT in learning is determined by using PU and PEOU (Macharia & Nyakwende, 2010). Even though TAM ultimate goal is to determine actual usage, it may additionally be used to explain why users such as students' may additionally accept or not accept a particular ICT system in their learning (Jung et al., 2008).

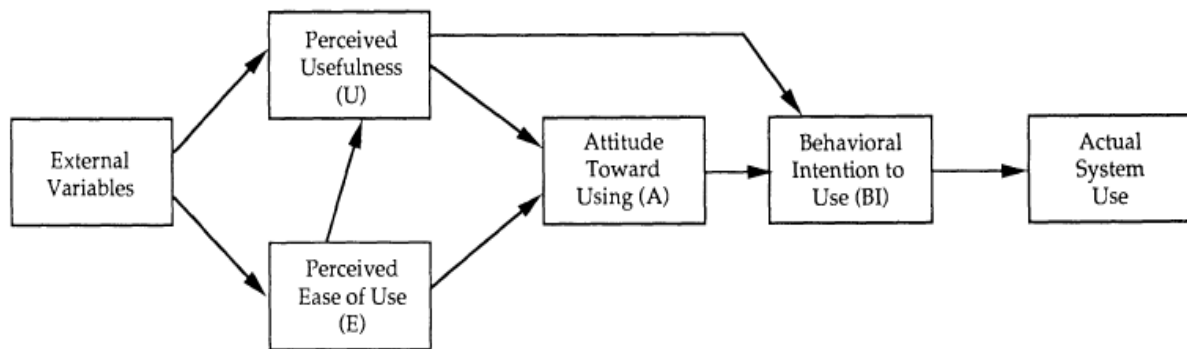


**Figure 2-1: Technology Acceptance Model (TAM)**

Source: Davis, Bagozzi, and Warshaw (1989)

In Figure 1, the TAM, developed by Davis (1989), is a revision of the theory of reasoned action (TRA), modified explicitly for users' acceptance of ICT systems (Davis *et al.*, 1989). The purpose of the TAM is to provide reasoning of the factors of information systems acceptance, and this gives an explanation on users' behaviour towards a range of ICT and theoretical validation (Davis *et al.*, 1989).

### 2.8.1 External variables (EV)

Represents the factors and challenges that students face that come from outside their sphere of control while integrating a new technology innovation in their teaching and learning development. These challenges are:

- Access to computers and laptops

- Electricity in the community and ICT infrastructure
- Prior computer experience
- Exposure to ICT
- Lack of effective training
- Limited network connectivity
- Age
- Gender

### **2.8.2 Perceived usefulness (PU)**

Represents the degree to which they trust that the use of ICT could enhance their learning performance. If students feel there is no need to alternate their education practice then, consistent with research, they are unlikely to adopt the usage of ICT tools. However, if students perceive ICT to be useful to their learning then, according to the empirical proof of preceding research shows that they are more likely to have a positive attitude towards using ICT within classrooms (Cox, Preston & Cox, 1999). These factors are as follow:

- Increase learning performance
- Increased productivity
- Effectiveness
- Usefulness

### **2.8.3 Perceived ease of use (PEOU)**

Represents to which degree they trust that the usage of a particular system could be user friendly. According to (Ghavifekr *et al.*, 2016) stated that previous research had diagnosed several things regarding the perceived ease of use of ICT, in observe on skilled ICT users. Furthermore, the research identified a considerable variety of competencies and skills which students felt they needed to know in order to find ICT easy to use. Which are:

- Easy to learn
- Clear and understandable
- User friendly
- Easy to manage
- Ease to remember

#### **2.8.4 Attitude towards use (U)**

Indicates students negative or positive feeling towards using a device or using any technology system at the university. Mainly, students' attitudes towards these elements will depend upon how they perceive using ICT on a personal level as well as their learning in the classrooms.

#### **2.8.5 Behavioural intention (BI)**

The degree to which the students has formulated a conscious plan to carry out or to carry out some specified future behaviour.

- Using ICT in learning
- Use of ICT in classrooms
- Tasks and assignments
- Blended learning

### **2.9 Conclusion**

This chapter has reviewed how students perceive technology, factors that influence their perception of ICT, perceived usefulness and perceived ease of use, including strategies that can be implemented. Hence, this study investigates students' perception of the role of ICT in their learning and will draw from the technology acceptance model proposed by Davis. In the next discussion, chapter three will explain the research methodology used. See what is said and check all the chapters

## **Chapter three**

### **3.1 Research methodology**

The focus of this section is on the research methodology that was used to answer the research questions and achieve the objectives. The first section is devoted to the research approach, research paradigm and the overall research strategy. This study aims to investigate students' perception of the role of ICT in their learning. The research methodology is the process that covers the entire research objective and the approach that will be used to uncover the specific problem at hand. This study made use of a census survey to determine students' perception and the use of ICT in their learning.

The research methodology is the general approach that the researcher used in the process of the research study to examine a specific problem (Collis & Hussey, 2013). In this chapter, the first four sections are devoted to the discussion that deals with the research design, research paradigm, inductive and deductive reasoning, and research procedure. This study has adopted positivist approaches; however, there are qualitative elements that convey into this study the phenomenological/interpretive elements. These strategies and elements of research paradigm are discussed as followed.

### **3.2 Research design**

Research design is the architectural blueprint that links all steps to ensure that the procedure is carried out with the essential rigour leading to decisive conclusions and favoured recommendations in research (Bickman & Rog, 2008). Numerous alternatives are at the disposal of the researcher, and the most suitable has to be selected. A research design is a method used for a specific research determination (Bhero, 2012). This study has adopted a research design as described by (Saunders, Lewis, & Thornhill, 2007). This study followed a research onion approach, using quantitative positivism paradigm method, deductive approach, census survey strategy, and using a purposive sampling method to collect data.

The research onion, developed by Saunders *et al.* (2007) illustrates the levels involved in developing a research study. The research onion layers supply an excellent detailed description of the levels of a research procedure (Emmanuel, 2019). The author indicated that it gives a significant progression on how a research methodology may be designed. Bryman (2012) indicated that its usefulness lies in its adaptability that can be used for almost any form of research methodology and can be used in diverse surroundings.

Saunders, Lewis, and Thornhill (2012) noted that while the use of research onion, one has to start from the outer layer than towards the inner layer. Saunders *et al.* (2007) assert that when viewing the onion from the outside, every layer of the onion describes a detailed level of the research process. The author asserts that for the internal layer to be seen, the outer layer must be unwrapped first, unwrapping each layer of an onion layer by layer. In order to reach a goal, the right steps ought to be taken; therefore, this applies in research by completing one step first before going to the next step (Emmanuel, 2019). In the figure below illustrate the Saunders research onion:

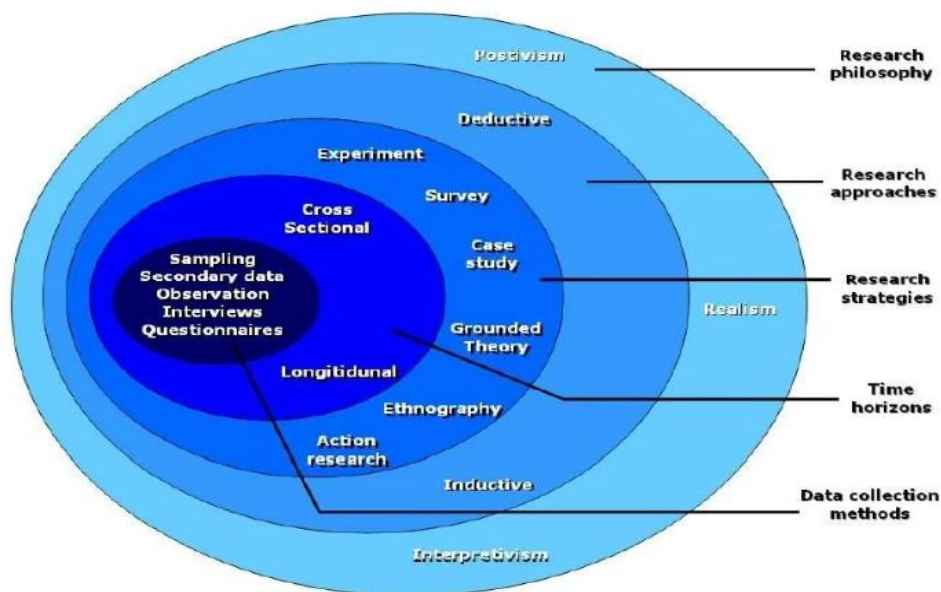


**Figure 3-1: Research onion**

Source: Emmanuel (2019)

In figure 2, the research onion developed by Saunders *et al.* (2007) describe the stages that a researcher must pass when developing a practical methodology. The research onion is an extension of the research methods tree.

### 3.3 Research paradigm

Guba and Lincoln (1994) asserted in their study that a research paradigm gives a framework which presents a set of restrictions and a worldview that guides research. A worldview is a paradigm, an idea or belief system that guides the way people believe and their actions (Creswell & Creswell, 2017). A research methodology is a part of a paradigm which establishes regulations and standards used in a research study (Creswell, 2013). Positivist and interpretive are the

prominent philosophical worldviews in the studies paradigm (Creswell & Creswell, 2017). The positivist method is quantitative in nature which is widely referred to as a scientific approach, and an interpretive method is a qualitative approach. Positivism is a worldview for engaging in a conventional form of scientific studies, and at the beginning, evolved for studying likely phenomena (Obinkyereh, 2017).

### **3.3.1 Positivism paradigm**

Positivism is the idea that guides scholars to conduct quantitative and scientific research (Obinkyereh, 2017). The clinical studies methodology allows a researcher to build up understanding by using system theory about observed phenomena within the world, derive and check hypothesis objectively, observes the consequences, affirm or refute the speculation and either take delivery of, modify or reject a theory (Creswell, 2013). A quantitative approach is summative, which helps scholars to determine or observe things about phenomenon scientifically or mathematically. Researchers use quantitative research approach to identify problems or challenges to establish a relationship among variables that the researcher makes use of, such as an observation and measurement to study a phenomenon to find facets that exist in society (Creswell & Creswell, 2017). A quantitative study starts with an idea or theory, information collected through a survey and analysis of data that either supports, rejects or refute the theory (Obinkyereh, 2017).

### **3.3.2 Interpretive paradigm**

The interpretive paradigm is a worldview based on the notion that people have the subjective meaning of factors, and each character thinks differently (Bryman, 2001; Creswell, 2013). Creswell (2013) asserts that the interpretive paradigm is a commentary of behaviour than a dimension of scientific theory. Interpretive research is also known as constructivism is primarily based at the idea that one cannot show or disprove a hypothesis but can most effective become aware of, discover and provide an explanation for factors in a particular social placing (Ghauri, Grønhaug, & Strange, 2020). Interpretive studies paradigm makes use of a qualitative research method.

Although positivism is recognised for its generalizability and objectivity, it cannot fit directly as a concept to use in social science (Bhero, 2012). A business environment consists of variables which might be too complicated to lend themselves to theories of particular guidelines of physical sciences (Saunders *et al.*, 2007). If mechanistic guidelines of positivism had been used without caution, the insights hidden in the complexity of phenomenological would be lost (Bhero, 2012). Furthermore, business and management study encounters situations and individual behaviours,

which is distinctive to an actual setting. This pattern of effects pertains only to that setting and can range as soon as instances changes. This instantly casts doubt at the generalisability of interpretive/phenomenological study, which might not follow a fixed law but subject to distinctive features or characteristics of a business industry that is ever-changing (Bhero, 2012). This research adopted a quantitative approach associated with a positivist paradigm that will be ideal for this study

### 3.4 Research approach

#### 3.4.1 Inductive approach

The aim of research studies is to add knowledge by using either inductive or deductive logic. The inductive logic starts with an observation and develops a new theory (Kammerlander & De Massis, 2020). This method entails “theory building”, whereby information is gathered to create a concept that explains the relationships between factors and enable the research to create new knowledge (Bhero, 2012:45). However, Bhero (2012) citing from Malik (2012) argues that new theory does not give a hundred per cent guarantee of facts found but confirms probability in truth.

#### 3.4.2 Deductive approach

The deductive method is based on a logical line of thought and starts with a set of evidence or hypothesis to solve the research question. Deductive reasoning is invoked when starting with a theory, a hypothesis is derived from the concept is empirically examined the use of the statistics in order to show correspondence to the established concept (Bhero, 2012). This study will follow a deductive approach. In the below figure illustrate both Inductive and Deductive reasoning:

**Figure 3-2: Inductive and Deductive reasoning**



Source: i2tutorials.com (2019)

Figure 3, Illustrates the inductive and deductive approach, the main distinction between inductive and deductive reasoning is that inductive reasoning objective is to develop a theory and deductive reasoning objective is to test an existing theory. Each technique is used in various studies; however, it is not unusual to combine these methods in a study, such as a mix method approach.

### **3.5 Research procedure**

This study adopted a quantitative method associated with the positivist paradigm. However, due to the nature of this study, there are qualitative elements that convey into this study the phenomenological/interpretive elements. According to Sexton (2007) on a continuum of ontology and epistemology spectrums, positioned research studies in between the two extremes (interpretivism and positivism), within the terrain of interpretivism, suggesting that even though the study at may be positivist, it is also able to contain some philosophical positioning.

This research aims to investigate students' perception of the role of ICT in their learning at the North-West University Mahikeng campus. In this study, a quantitative methodology was adopted as opposed to qualitative and mixed-method approach. A survey questionnaire was designed to collect and analyse the data obtained from all the respondents. Approval was given by the faculty dean and Research Data Gatekeepers committee (RDGC). The survey was distributed to students through efundi with the help of lecturers in the Faculty of Economic and Management Sciences (FEMS). The efundi platform is a learning and collaborative management systems that support communication between students and lecturers and creates an environment for students and lecturers to interact with one another at the North-West University ([www.efundi.nwu.ac.za](http://www.efundi.nwu.ac.za)). This study administered the Protection of Personal Information Act (POPI); the researcher collects no personal information from students. Participants were assured that their privacy status would be respected and kept confidential. The survey was designed solely to address the research objectives concerning students' perception of the role of ICT in their learning at the university.

### **3.6 Data collection**

#### **3.6.1 Population and sampling**

A population is a set of components or cases in a standard set to be studied (Bhero, 2012). In a few instances, the population may be small enough and of measurable size to produce helpful results (Saunders *et al.*, 2012). On the other hand, in some cases, a population can be impracticable to address. For instance, the populations might be too large, or it might be costly in order to study whole population or time constraints might not permit if results are required speedily

(Saunders & Lewis, 2009). In such instances, a sample can be used as an alternative if the sample is chosen; sampling error should be reduced in order to represent a population (Bhero, 2012).

North-West University was established in 2004, with campuses situated in Potchefstroom, Mahikeng and Vanderbijlpark. However, this study focused on the Mahikeng campus only. The purpose of choosing the Mahikeng campus is due to the nature and the topic of the study. Mahikeng is considered a semi-rural town and most students enrolled at the Mahikeng campus come from disadvantage backgrounds. North-West University has eight faculties between the three campuses, the Faculty of Economic and Management Sciences (FEMS) is the largest faculty on the Mahikeng campus. The FEMS faculty was relatively large enough to provide an adequate sample size to represent the entire population. This study received ethics clearance and approval from the relevant stakeholders and complied with the Protection of Personal Information (POPI) acts. The faculty provided information on the total population size. The total population for first-year students is 1190.

### **3.6.2 Sampling technique**

Maree (2007) asserts that if time and cost are constraints, it is seldom to include an entire population. A sampling includes the selection of a reasonable number of participants from the studies population being researched (Blanche, Blanche, Durrheim, & Painter, 2006). A sample group ought to be a representation of the population being studied (Koranteng, 2012). A research population does not always refer to human beings; however, any collective phenomenon decided on to form the point of interest of studies, whether it is people, artefacts, settings, behaviours or social strategies (Goddard & Melville, 2005). Maree (2007) indicated that there are two sampling methods/techniques, probability and non-opportunity sampling.

#### **3.6.2.1 Probability sampling**

Babbie and Mouton (2001) are of the view that probability sampling is referred to as a method or approach by selecting a potential number of participants from a population wherein the exact population number and location is known and available by the researcher. Furthermore, the aim of probability sampling is to select a group that portrays the actual parameters that exist inside the represented population, which makes use of a random selection procedure. Creswell (2013) indicated that with this approach, every participant of a population has an equal chance of being selected in the sample group. Probability sampling is used for statistical purposes and is a method used in quantitative studies. This focus allows for generalisation to be done on the information gathered from the sample. However, probability sampling will not be chosen; due to time and cost constraints.

### **3.6.2.2 Non-probability sampling**

Non-probability sampling, on the other hand, is a method of selecting members from the population, but the number and location of the population are not known by the researcher (Babbie & Mouton, 2001). For instance, this method of sampling can be used to sampling homeless people (Koranteng, 2012). Individual participants of a population do not have an equal chance of being selected into the sample; random sampling methods are not utilised in non-probability sampling (Maree, 2007). The non-probability approach is used when access to the entire population is not possible. Non-probability sampling is ideal for qualitative studies where an in-depth approach is needed.

### **3.6.2.3 Purposive sampling**

Purposive sampling is when researchers think thoroughly through how they will establish a sample population. This process was used in order to target suitable respondents from North-West University Mahikeng campus. According to Etikan, Musa, and Alkassim (2016) indicated that the purposive sampling method is also known as judgment sampling, the researcher deliberately choose participants who fit the particular requirements or relevance to the study. Purposive sampling is an in-depth approach to selecting data-rich cases, and the researchers make a subjective decision on which data would be best provided for more detailed information in the study (Burns & Grove, 2007; Patton, 1990). This study used purposive sampling due to the nature of this study and the target group. This study purposely focused on first-year students in the Faculty of Economic and Management Sciences (FEMS) and due to the large enough size to sample.

## **3.7 Survey strategy**

According to Saunders *et al.* (2007), a survey strategy is often connected with the deductive approach. It is an excellent method that is cost-effective; researchers can accumulate valuable and dependable information. Surveys are utilised in quantitative research and involve a representative sampling of the population (Bryman & Bell, 2011). This method observes contributing variables among other variables. This method assisted with the gathering of information and was used to answer the researchers' questions.

The descriptive survey refers to the type of research questions, research design and data analysis that will be implemented to a given subject topic (Galloway, 2003). Descriptive survey studies are pre-planned and structured in a way that data gathered may be statistically assumed on a population (Ethridge, 2004). The principle concept of the descriptive survey is to define an opinion,

behaviour or attitude of people by collecting information held by a group of an individual on a given subject (Bonde, 2018). Due to the convenience and advantages of a descriptive survey, this method was ideal; this study followed this approach.

### **3.7.1 Census**

A census is a method of systematically acquiring information about members of a given population. This method is commonly used when sampling the national population, housing, traditional culture, agriculture, supplies, and business censuses (Kish, 1979). Furthermore, a census can be compared with sampling in which information obtained only from a subset of a population. The modern census is typically used for research, business marketing and planning, and as a baseline for designing sample surveys (Bennett, 2019). A census is opposite to a sampling method, and it is used to count everyone in a population rather than a segment (Freedman, 1991). However, population censuses depend on a sampling frame to count the entire population. This approach will be used to survey students through efundi.

This study followed a census approach, where they survey the whole population because the questionnaire was sent to the whole study population on efundi. The study thus follows a non-probability purposive sampling method; the survey link was distributed to first-year students with the help of lecturers in FEMS. Everyone in the sample population had an equal chance to participate. Hence, the study adhered to COVID 19 Protocols by not having any human contact.

### **3.7.2 Demographics in survey**

Researchers routinely acquire demographic information to describe the sample of people in their studies (Connelly, 2013). Demography is a discipline of study in which researchers take a look at the quantifiable information of a specific population (Vogt & Johnson, 2011). The information is used to identify subsets of the population and characterise them at a specific point in time (Connelly, 2013). Typical demographics are age, ethnicity, sex, level of education, employment, disabilities, and topic-specific characteristics of a study (Connelly, 2013). Against this background, the study as part of the research process of asking demographic questions to gain an understanding of the characteristic of the population the demographic data was collected.

## **3.8 Data analysis**

The information accrued from the respondents was collected together to be analysed using the Statistical Product and Service Solutions (SPSS) model 26. Both descriptive and inferential analysis was included. Descriptive analysis was used to analyse the percentage and the frequency of the overall population within the demographic context. This was also used to decide

the mean and preferred deviation. Inferential statistics (t-test) have been extensively utilised to investigate the research findings (Ghavifekr *et al.*, 2016).

### **3.9 Validity and reliability**

This study aims to ensure that internal and external reliability and validity will be obtained. Obinkyereh (2017) indicated that the reliability of a study should be able to measure the validity of a survey. Bell, Bryman, and Harley (2018) asserted that validity ensures or confirms that a tool measures what it is set to achieve and obtain the required results. Internal validity exams whether or not there is a match between observations and theoretical concept developed and ensuring data is theoretically supported (Obinkyereh, 2017). Furthermore, external validity refers to how research finding will be used for generalisation. Trustworthiness and authenticity are criteria that are included to check the internal validity of a survey. Trustworthiness in this regard means that the research is credible, dependable and transferable (Obinkyereh, 2017). The aim of this research is to carry out a quantitative practice that ensures credibility from respondents.

Creswell (2014) indicated that history, selection, maturation and instrumentation as threats to internal validity. Internal validity threats can be resolved as followed; Creswell indicated that the survey instrument should be administered due to the changing of events; this will influence the outcome of the study. Respondents may change their minds which may have an impact on the study. The research study should select Participants that accurately represented the population and select participants maturing and changing at the same time.

### **3.10 Research limitation**

The researcher anticipated the issue in getting participants to spare some time to respond to the online survey; this was expected. Students are usually too busy and may consider participating to be extra-mural activity and not respond to the studies pursuit. For convenience sake and accessibility, this study focused on first-year students at the North-West University Mahikeng Campus only, the generalizability of the findings for the entire North-West University can be implicated because of the narrow placing of the campus. The questions were intended to call on prior experience with ICT before coming to the university. However, not all students have prior experience or have a computer/laptop. On this regard, some responses might not be a precise portrayal of events. However, this study intends to expose the overall perception of students in the role of ICT and how these systems influence their learning and development.

### **3.11 Ethical consideration**

Two dimensions of ethics are described by (Guillemin & Gillam, 2004). These dimensions of ethics are Procedural ethical and ethics in practice. According to Ellis (2007) indicated that procedural ethical mandated by Institutional Review Board (IRB) committees deal with confidentiality, rights to privacy, informed consent, protecting human subjects and deception. Ethics in practice, on the other hand, deals with unpredictable, often subtle, however ethically significant moments that come up in the field of research (Goodwin, Pope, Mort, & Smith, 2003). Many professions, institutions or organisations have ethical standards that suit their objectives and goals. In research, it is imperative to adhere to ethical standards. According to Resnik (2011) asserts that ethical standards promote the purpose of research, such as truth, knowledge and prevention of errors (e.g., falsifying of research information). Furthermore, the research includes a lot of participation and coordination among various individuals in various disciplines and organisations; ethical standards promote the qualities that are crucial to collective work, for instance, mutual respect, trust, fairness and accountability.

Ethical standards are there to ensure that researchers are held accountable to the public (Resnik, 2011). For instance, policies on research misconduct laws, the rights of the human subjects, conflicts of interest and animal care are required to ensure that publicly funded researchers can be held accountable.

Ethical standards also help build public support for research (*ibid*). Institutions or people are more likely to finance research projects if they can trust research quality and integrity. Research standards should validate a number of important moral and social values, such as human rights, health and safety, compliance with the law and social responsibility (Shamoo & Resnik, 2009).

#### **3.11.1 Process of obtaining informed consent**

An invitation letter to seek consent from participants is an excellent way of formally introducing the questionnaire to the respondents (Borg & Gall, 1989). By this means, it will provide an introduction for the participants to answer the questionnaire. Each participant was presented with a consent form to read and understand before volunteering. Cohen, Manion, and Morrison (2007) indicated that research ethics institutes the dos and don'ts once conducting a study in order to protect respondents, as well as, to ensure that respondents are aware of the research procedure and willing participation. Researchers are expected to abide by the moral conduct that ensures that participation in their study will not end in any sort of risk. Fraenkel, Wallen, and Hyun (2012) asserts that it is the researchers' responsibility to protect the participants from any harm.

As mentioned above from researchers, participants will receive an invitation letter electronically. The invitation letter was received through efundi, accompanied with the survey link, this directed the prospective participant to the actual survey platform where the participant gave consent in order to continue with the survey. According to Petrovčič, Petrič, and Manfreda (2016) seeking consent from the respondents to participate on an online survey is taken into account as ethical practices that make sure that respondents are voluntarily collaborating on the study. Too be aware of any scrutiny and avoiding prejudice, the information was received by researchers and an independent person (Supervisor). The participant consent letter and invitation letter is attached, see page 89 Annexure B and page 90 Annexure C.

### **3.11.2 Permission to conduct research on the NWU Mahikeng campus**

Bryman *et al.* (2014) indicated that informed consent is critically essential for respondents to be aware of the procedures undertaken. Furthermore, respondents should be informed in a language that they understand before giving any consent. Bell (1991) suggested that consent should be gained in the early stages so that participants are aware and well informed on the procedures and the purpose of the research study. The study introduced the researcher, the topic of this study, the purpose and ensured that the right to privacy, anonymity and confidentiality would be protected. Request for permission to conduct research in the Faculty of Economic and Management Sciences (FEMS) and request to conduct research at NWU was addressed to the Research Data Gatekeepers Committee (RDGC), and research approval was granted.

This study received approval from the NWU Mahikeng campus and followed the code of conduct that the researcher was obligated to follow. The code of conduct entails rules and regulations that should be administrated by the researcher. A request form for approval is attached to Annexure D on page 91.

### **3.11.3 Process of invitation to participate**

The invitation letter was a formal invite and request to all respondents to take part in an online survey. The invitation letter is attached to ANNEXURE C. This approach has proven to be sufficient to request respondents to participate in an online survey (Petrovčič *et al.*, 2016). Respondents received a consent form, which is attached to ANNEXURE B.

Seeking consent is considered as an ethical approval; respondents can make an informed decision as to whether they will either participate or not on an online survey (Roberts & Allen, 2015). The consent letter was on the first section of the survey for respondents to read and accept/decline, once the respondents clicked on the **I AGREE** with checkbox, then only were they permitted to take part on the survey. According to Roberts and Allen (2015) suggested that this

should be on the first section before respondents are directed to the survey questionnaire. This gave the respondents the time to read and to understand the procedure and to agree to the consent letter. (Attached see ANNEXURE B, CONSENT FORM).

#### **3.11.4 Privacy, anonymity and confidentiality**

Collecting information is considered unethical without the knowledge and consent of the participant, which implies that subjects are made aware of the information desired, and why the information is required, for what motive, how will participants be implicated directly or indirectly (Bhero, 2012). Depending on the nature of the research study respondents should be clarified on the issues of confidentiality and anonymity (Bryman *et al.* 2014). The research study further stresses the importance of this research, respondents participated anonymously, and all information was confidential. The invitation letter informed respondents regarding the aim of this research study and objectives.

According to Cohen *et al.* (2007) respondents “right to privacy” and “anonymity” should be regarded as necessary because these rights can be easily violated in research studies. Kumar (2005) suggests that participants should be informed on the objective and procedures, as well as the pros and cons of the research study. Once the information is collected, the researcher is responsible for ensuring that this information is not accessible to anyone outside the process of this study (Fraenkel *et al.*, 2012). The online survey did not contain any questions that could link prospective participants to the study and ensured participants anonymity and confidentiality. This study protected the right to privacy, anonymity and confidentiality of all respondents. Information and access to the questionnaire were restricted; this study was only for academic purpose.

#### **3.12 Conclusion**

In chapter three presented the research methodology that was used in this study, the population of this study and census that was used to survey the population. Chapter three discussion dealt with the research paradigm, research procedure, population size, census technique, and ethical considerations concluded this. In the next chapters will present on the Data collected and analysis, interpretation, recommendations and conclusion.

## **Chapter four**

### **Presentation and Data analysis**

#### **4.1 Introduction**

Chapter four presents the data analysed from participants in the Faculty of Economics and Management Sciences (FEMS), North-West University (NWU) Mahikeng campus. The information discusses the findings on students' perception of the role of ICT in their learning. The data was collected using an online survey that was administered through efundi. The information presented was analysed in order to address the objective and purpose of this study. The objectives of this study are presented as follows:

- To investigate students' perception of the role of ICT in their learning.
- To determine factors that influence student's perception of the role of ICT in their learning.
- To assess how the perceived ease of use (PEOU) of ICT will affect students' intention to use ICT in their learning.
- To assess how the perceived usefulness (PU) of ICT will affect students' intention to use ICT in their learning.
- To provide recommendations of strategies that can be used to improve the Influence of students' perception to improve their learning.

The information accrued was analysed using the Statistical Product and Service Solutions (SPSS) model 26. The study received a response rate of 236 participants that completed the online survey. The response rate is presented in the next discussion.

#### **4.2 The response rate from participants**

As indicated earlier, the survey was distributed through efundi. All prospective participants had an equal chance to participate online. Participants were informed that once the desired sample size was reached, the survey will be closed by the researcher. However, due to time constraints to complete this research on time, the survey was closed before the sample size was achieved. The desire sample size indicated by the researcher is 291. However, the data shows that 388 participants started the survey online, 152 dropouts and 236 participants completed the survey. Comparing the sample size of 388 with the 236 respondents gives us a response rate of 60.8%. In the analysis that follows, indicates the response rate of participants, due to the inconsistency, some questions were not answered.

The table below shows that 60.8% of the data had no missing values, and the table shows that the remaining 39.2% had 9 to 100 missing values. The researcher decided to use complete data only. Since the researcher chose to use 60.8% of the data, it was necessary to confirm whether the sample is still adequate, given the number of variables in data. This was confirmed using the Kaizer Meyer Oklin (KMO) measure of sample adequacy. The KMO was 0.876, which is greater than 0.7, thus indicating that the 236 observations are adequate, given the 42 variables

**Table 4-1: Missing data**

| <b>MISSING DATA</b>                                |                  |                 |                      |                           |
|----------------------------------------------------|------------------|-----------------|----------------------|---------------------------|
| <b>Number of missing values in the observation</b> | <b>Frequency</b> | <b>Per cent</b> | <b>Valid Percent</b> | <b>Cumulative Percent</b> |
| 0                                                  | 236              | 60.8            | 60.8                 | 60.8                      |
| 9                                                  | 3                | .8              | .8                   | 61.6                      |
| 20                                                 | 11               | 2.8             | 2.8                  | 64.4                      |
| 30                                                 | 11               | 2.8             | 2.8                  | 67.3                      |
| 41                                                 | 19               | 4.9             | 4.9                  | 72.2                      |
| 63                                                 | 26               | 6.7             | 6.7                  | 78.9                      |
| 80                                                 | 1                | .3              | .3                   | 79.1                      |
| 83                                                 | 26               | 6.7             | 6.7                  | 85.8                      |
| 93                                                 | 1                | .3              | .3                   | 86.1                      |
| 100                                                | 54               | 13.9            | 13.9                 | 100.0                     |
| <b>Total</b>                                       | 388              | 100.0           | 100.0                |                           |

In table 4.1, the table shows that 60.8% of the data had no missing values, and the remaining 39.2% had 9 to 100 missing values. The construct reliability test results are presented next.

### 4.3 Reliability analysis

Reliability analysis looks at the properties of measurement scales and items that compose the scales. The use of Reliability analysis process calculates several commonly used measures of scale reliability and additionally gives information around the relationships among variables.

**Table 4-2: Reliability**

|                                                                                                    | Cronbach's Alpha | N of Items     |
|----------------------------------------------------------------------------------------------------|------------------|----------------|
| Students' perception of the use of ICT in learning: Attitude toward use (A)                        | .880             | 9              |
| Factors that influence students' perception of the use of ICT in learning: External Variables (EV) | .611             | 6 <sup>1</sup> |
| Influence of perceived usefulness of ICT in learning: Perceived usefulness (PU)                    | .819             | 5              |
| Influence of perceived ease of use of ICT on learning: Perceived ease of use (PEOU)                | .833             | 4 <sup>2</sup> |
| Strategies that will influence students' perception of the role of ICT: Behavioural Intention (BI) | .724             | 5              |
| Measuring ICT actual system use                                                                    | .850             | 4              |

**Table 3: Reliability**

In table 4-2, indicated that since all the Chronbach's alpha values for each construct are greater than the accepted minimum value of 0.6 (Dasgupta, Biswal, & Ramesh, 2017:44), the items in each construct are reliable.

- 
- The following variables were excluded from the construct since they had negative Corrected item-total correlations which jeopardised the reliability of the construct: a) I often find it challenging to collaborate with other students and to interact with lecturers using ICT technology, b) There is an Insufficient number of laptops for students, c) There is a lack of academic models on how to use ICT for learning, and d) Most lecturers are not in favour of using ICT in classrooms.
  - The following variable was excluded from the construct since they had negative Corrected item-total correlations which jeopardised the reliability of the construct: I often find it difficult to use ICT technology in classrooms

#### 4.4 Relationship between ICT actual system use and the other variables

The following benchmarks are used in interpreting the strength of the correlations in the table below: 0 to less than 0.2 implies a no to very weak correlation, 0.2 to less than 0.4 indicates a weak correlation, 0.4 to less than 0.6 is a moderate correlation, 0.6 to less than 0.8 implies a strong correlation, and 0.8 to 1 is a very strong correlation (Salkind, 2007: 127).

**Table 4-3: Testing relationships between variables**

|                                                                                                    |                         | Measuring<br>ICT actual<br>system use |
|----------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------|
| Students' perception of the use of ICT in learning: attitude toward use (U)                        | Correlation Coefficient | .312**                                |
|                                                                                                    | P-value                 | .000                                  |
|                                                                                                    | N                       | 236                                   |
| Factors that influence students' perception of the use of ICT in learning: external variables (EV) | Correlation Coefficient | .036                                  |
|                                                                                                    | P-value                 | .584                                  |
|                                                                                                    | N                       | 236                                   |
| Influence of perceived usefulness of ICT in learning: perceived usefulness (PU)                    | Correlation Coefficient | .448**                                |
|                                                                                                    | P-value                 | .000                                  |
|                                                                                                    | N                       | 236                                   |
| Influence of perceived ease of use of ICT on learning: perceived ease of use (PEOU)                | Correlation Coefficient | .292**                                |
|                                                                                                    | P-value                 | .000                                  |
|                                                                                                    | N                       | 236                                   |

|                                                                                                    |                         |        |
|----------------------------------------------------------------------------------------------------|-------------------------|--------|
| Strategies that will influence students' perception of the role of ICT: behavioural intention (BI) | Correlation Coefficient | .370** |
|                                                                                                    | P-value                 | .000   |
|                                                                                                    | N                       | 236    |

This implies that the following variables have weak (0.2 to less than 0.4), positive and significant correlations (p-values < 0.05) with ICT actual system use: a) Students' perception of the use of ICT in learning: attitude toward use (U), b) Influence of perceived ease of use of ICT on learning: perceived ease of use (PEOU), and c) Strategies that will influence students' perception of the role of ICT: behavioural intention (BI). There is a moderate (0.4 to less than 0.6), positive and significant (p-value < 0.05) correlation between Influence of perceived usefulness of ICT in learning: perceived usefulness (PU) and ICT actual system use. These correlations imply that a positive change in the U, PEOU, BI and PU will lead to an increase in ICT actual system use.

In table 4-3 shows that Factors that influence students' perception of the use of ICT in learning: external variables (EV) is not significantly correlated with ICT actual system use (p-value > 0.05).

#### 4.5 Data interpretation – Section A

|                          |                    | Frequency | Percentage |
|--------------------------|--------------------|-----------|------------|
| 1. Gender                | Male               | 107       | 45.3%      |
|                          | Female             | 129       | 54.7%      |
|                          | Total              | 236       | 100.0%     |
| 2. Age Group             | 18 – 24 years      | 210       | 89.4%      |
|                          | 25 – 34 years      | 23        | 9.8%       |
|                          | 35 – 44 years      | 1         | 0.4%       |
|                          | 45 years and above | 1         | 0.4%       |
|                          | Total              | 235       | 100.0%     |
| 3. Highest Qualification | Diploma            | 41        | 17.4%      |
|                          | Certificate        | 13        | 5.5%       |
|                          | Degree             | 178       | 75.4%      |
|                          | Honours            | 1         | 0.4%       |

|                                                                                          |           |     |        |
|------------------------------------------------------------------------------------------|-----------|-----|--------|
|                                                                                          | Masters   | 2   | 0.8%   |
|                                                                                          | PhD       | 1   | 0.4%   |
|                                                                                          | Total     | 236 | 100.0% |
| 4. Self-awareness level about ICT                                                        | Very high | 26  | 11.0%  |
|                                                                                          | High      | 107 | 45.3%  |
|                                                                                          | Not aware | 60  | 25.4%  |
|                                                                                          | Low       | 11  | 4.7%   |
|                                                                                          | Very low  | 32  | 13.6%  |
|                                                                                          | Total     | 236 | 100.0% |
| 5. Owns a device (PC or laptop)                                                          | Yes       | 150 | 63.6%  |
|                                                                                          | No        | 86  | 36.4%  |
|                                                                                          | Total     | 236 | 100.0% |
| 6. Has prior experience of using computers or laptops before enrolment at the university | Yes       | 152 | 64.4%  |
|                                                                                          | No        | 84  | 35.6%  |
|                                                                                          | Total     | 236 | 100.0% |
| 7. Received training on how to use ICT as a means for learning                           | Yes       | 80  | 33.9%  |
|                                                                                          | No        | 156 | 66.1%  |
|                                                                                          | Total     | 236 | 100.0% |
| 8. Rating of one's confidence in using ICT                                               | Very high | 31  | 13.1%  |
|                                                                                          | High      | 53  | 22.5%  |
|                                                                                          | Not aware | 121 | 51.3%  |
|                                                                                          | Low       | 28  | 11.9%  |
|                                                                                          | Very low  | 3   | 1.3%   |
|                                                                                          | Total     | 236 | 100.0% |

**Table 4-4: Demographic analysis**

In table 4-4, the data analysed presents the demographics of participants. Out of the 236 respondents that have participated in the survey, 45.3% were male respondents, and 54.7% were

female respondents. The results indicate that there is a reasonably balanced gender distribution among the respondents. However, the age group and the highest qualification shows that 210 respondents who are the majority fall between 18-24 years of age, which represent a total of 89.4% of the population. The highest qualification indicated that 178 of the respondent are pursuing a degree, which is 75.4% of the total population.

In the following section in table 4-4, respondents were required to rate their self-awareness level about ICT technology. The data analysis indicated a concerning percentage among respondents. When calculating the percentage between self-awareness levels about ICT, 56.3% either have a high or very high level of self-awareness about ICT technology. On the other hand, 43.7% indicated that their self-awareness levels about ICT are either low, very low or not aware. This indicated that there are gaps that need attention from relevant stakeholder to improve. This also shows that students entering university might be discouraged to enrol themselves in Information Technology careers because of self-awareness levels about ICT.

In contrast, the following section respondents were required to indicate if they own a device such as a computer or a laptop. The frequency column shows that 150 of the respondents indicated that they own a device, which is 63.6% of the population. However, 86 respondent indicated that they do not own a device, which represents 36.4% of the population. The information could indicate that there is some influence between Own a device (PC or a laptop) and Self-awareness level about ICT. The data also indicates that 36.4% of the respondents make use of computer lab facilities on campus. This put some students in a disadvantage position compared to their counterparts.

In the next section, students had to rate if they had any prior experience of using computers or laptops before enrolment at the university. According to the information acquired, 152 of the respondents indicated that they have prior experience of using either a computer or a laptop before entering the university. The total population of all respondents consists of 64.4%. However, 35.6% of the population have no prior experience. Students were required to indicate if they have received training on how to use ICT as a means for learning; 66.1% of the respondents indicated NO in their response. Comparing these two variables of 35.6% of no prior experience and 66.1% of no computer training will have a significant impact on students schooling careers and also affecting their confidence level in using ICT technology. The majority of the respondent rated their confidence in using ICT technology as Not aware, which makes up 51.3% of respondents.

In the next discussion, the second section of the questionnaire was based on the Technology Acceptance Model (TAM) using the Likert scale. A Likert Scale is a type of rating scale used to measure attitudes or opinions. With this scale, respondents were asked to rate items on a level

of agreement. For example, responders specified their level of agreement to a statement: by either strongly disagree; disagree; agree, or strongly agree. (See page 80, Section B - Annexure A).

## 4.6 Section B

### 4.6.1 Students' perception of the use of ICT in their learning: attitude towards use (U)

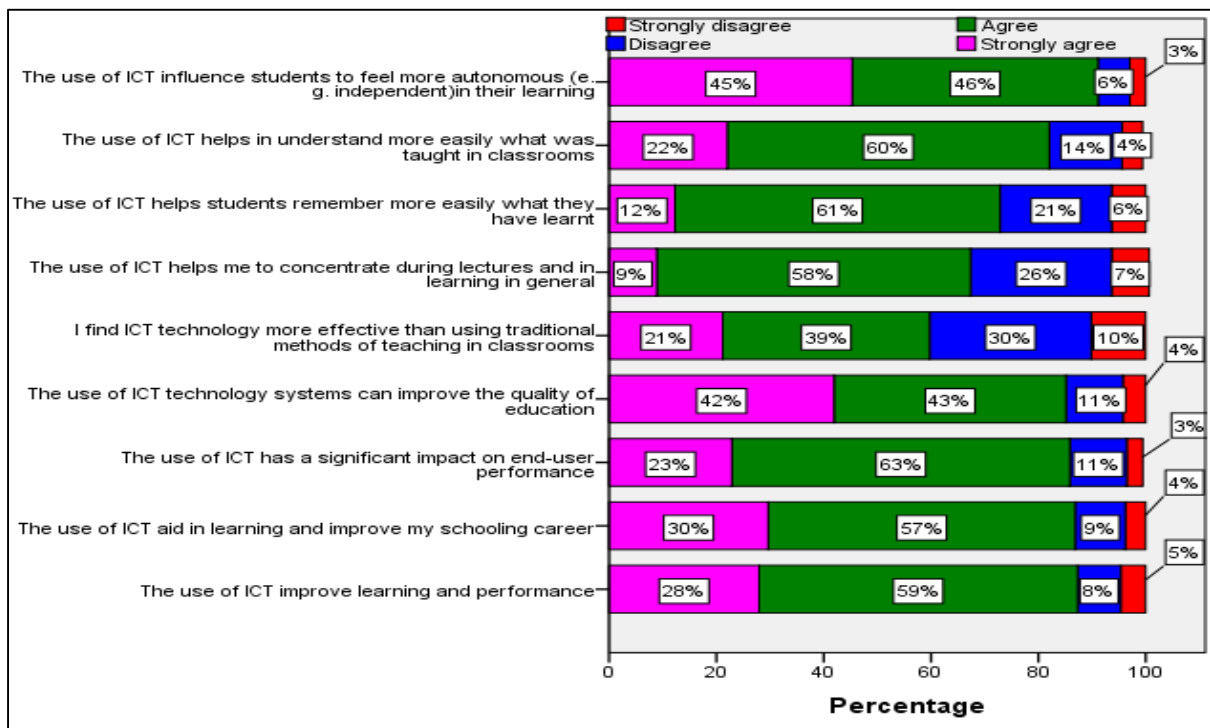


**Figure 4-1: Measuring attitude towards use (U)**

The clustered bar chart in Figure 4-1, shows that the participants were in agreement (Agree to strongly agree) with all the measures of attitude towards use (U). In the first statement, the use of ICT influence students to feel more autonomous in their learning; the majority of the respondents agreed, with a total of 46% followed with 45% who strongly agreed with that statement. The results correspond with Bora and Teki (2013) study, the authors indicated that there is a strong inter-dependencies among students' perception of ICT utilised in learning. However, 9% of the respondents were not in agreement with this statement. The following result, students were in agreement that the use of ICT helps in understand information and what was taught in classrooms. 60% of the respondents agreed, and 22% strongly agreed, 18% of the respondent thought otherwise. The results were as follows, 14% are in disagreement, and a slight 4% that strongly disagree.

From the finding, the majority indicated that the use of ICT helps students remember content that they have learnt, in no small percentage, a significant 61% of the respondents agree, second to that 21% disagree. Respondent was asked if they think that the use of ICT helps them to concentrate more in classrooms and their learning; 58% agreed, and 9% strongly agreed. However, 26% of respondents are in disagreement with a slight 7% of respondent who strongly disagrees.

The next statement, respondents were required to rate if ICT teaching and learning methods more effective than using traditional methods of teaching in classrooms. The results show that 39% were in agreement, and 21% strongly agree that ICT teaching and learning methods more effective than using traditional methods of teaching in classrooms. Although the results indicated that most students do feel that ICT teaching and learning method are effective, to no small percentage, 40% of respondents prefer the traditional means of teaching and learning. However, 85% are in agreement that ICT can improve the quality of education with a slight 11% who disagrees with this statement. According to Das (2019) indicated that ICT has several benefits and the potential to transform traditional means of teaching and learning. Concurring to this statement, the respondents believe that in no small degree 86%, ICT has a significant impact on end-user performance, 87% believe that ICT aid in their learning and improve their schooling career. 87% of the respondents also believe that ICT improves their learning and increases their performance. The following pie chart gives an aggregate of the participants' attitude towards use (U).

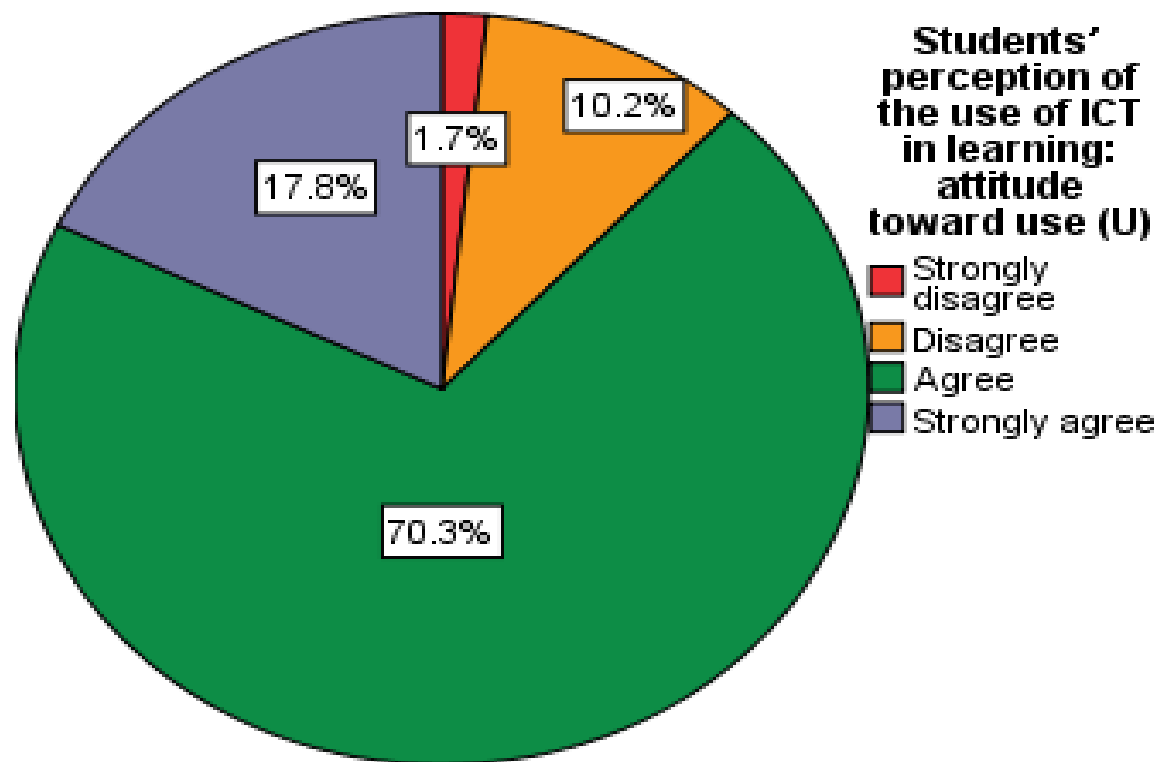


**Figure 4-2: Attitude towards use (U)-Aggregate pie chart**

The pie chart in figure 4-2 shows that in general, the majority of the students agreed with the propositions measuring the attitude towards the use of ICT (70.3%), followed by those who strongly agreed (17.8%), the third-highest percentage disagreed (10.2%) whereas only 1.7% strongly disagreed with this proposition. The purpose of this study is to answer the research questions and objectives. As stated in chapter 1; what is the students' perception of the role of ICT in their learning? To answer the question, ICT plays a significant role in their learning, 88.1% of the respondents are in agreement with this proposition and have a positive attitude towards using ICT as a means for learning. In the next discussion, presents the external factor that can influence students' perception of the use of ICT in their learning.

#### 4.6.2 Factors that influence students' perception of the use of ICT in learning: external variables (EV)

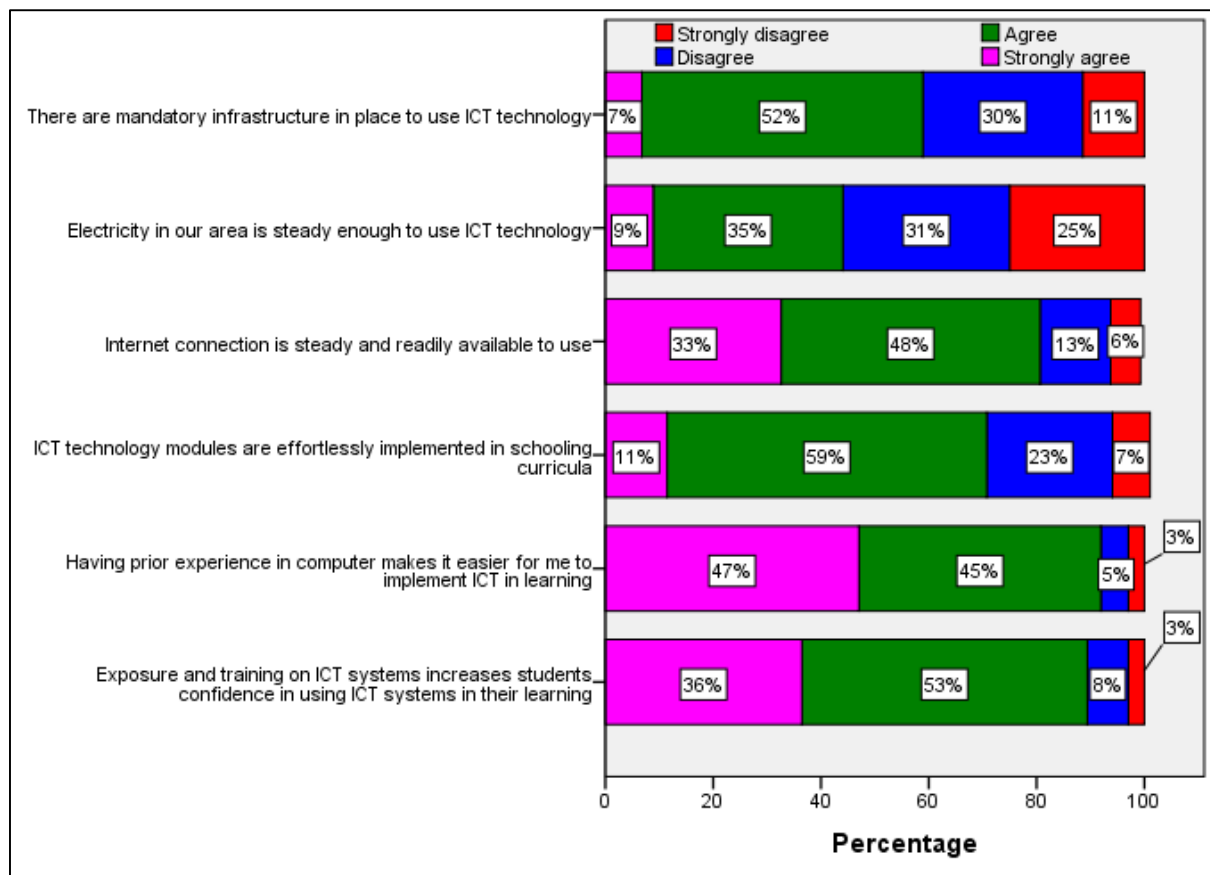


**Figure 4-3: Measuring external variables (EV)**

The clustered bar chart in figure 4-3 shows that the participants were in agreement (Agree to strongly agree) with all the measures of External variables (EV). 52% of respondents confirmed that there is mandatory infrastructure in place to use ICT; however, there are respondents that are in disagreement (disagree – strongly disagree) with this proposition. 30% disagree, and 11% strongly disagrees with that proposition. This indicated that this gap is slightly diminishing. Nonetheless, some concerns need to be addressed with regards to cost and infrastructure in rural communities. Another occurring issue in South Africa is unstable electricity due to load shedding and cable theft. There is a slight difference in percentage, 44% of respondent were in agreement (Agree to strongly agree). However, 56% were in disagreement (Disagree to strongly disagree). This indicates that many students are faced with these challenges and need attention from the government and relevant stakeholders. In order for students to make use of ICT, electricity is needed. Without electricity connection, will render these systems as unnecessary. On the NWU Mahikeng campus, students are accommodated with Internet connectivity. Majority of the respondents were in agreement (48% agree to, 33% strongly agree) that the Internet connection

is steady and readily available. Respondent also feels that ICT modules are effortlessly implemented in schooling curricula. 59% agree, and 11% strongly agree with this proposition.

There is a significant response to an agreement with (45% agree to, 47% strongly agree) prior experience in computers makes it easier for students to implement ICT in their learning. Furthermore, (53% agree to, 36% strongly agree) are in agreement that exposure and training on ICT systems increase students' confidence in using ICT systems in their learning. Having exposure and training on a computer at an early age increases end-user performance. However, 35.6% of the respondents indicated that they have no prior experience in ICT technology, and 66.1% did not receive any training on using these systems in their learning. This will need some attention from relevant stakeholder in order to reduce this gap and to give all student equal opportunity to develop their skills. The following pie chart gives an aggregate of the external variables.

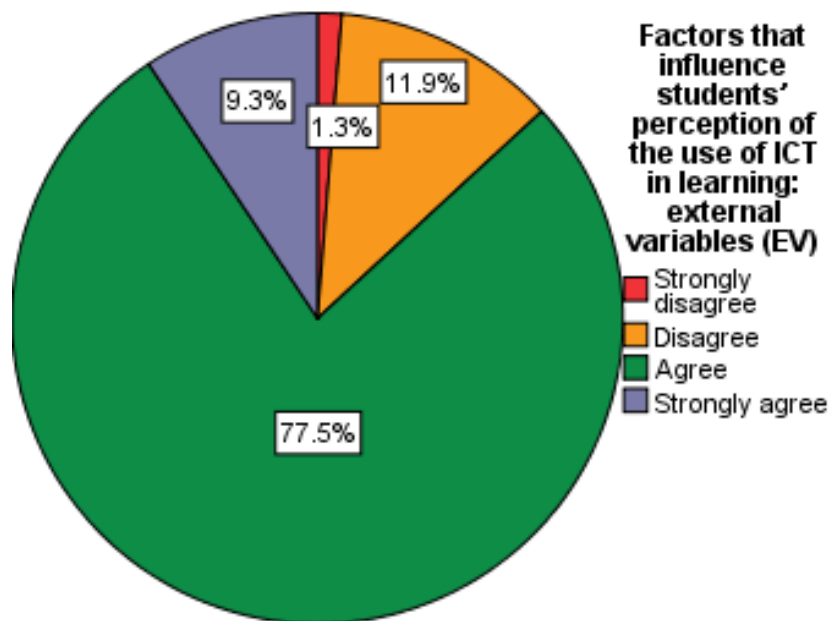


**Figure 4-4: Measuring external variables (EV)-Aggregate pie chart**

The pie chart in figure 4-4 shows that in general, the majority of the students agreed with the propositions measuring the external variables that influence students' perception of the use of ICT in their learning (77.5%). The results as follows, (9.3%) strongly agreed, the second-highest percentage disagreed (11.9%) whereas only (1.3%) strongly disagreed with this proposition. The question and objective were to determine factors that influence students' perception of the use of ICT in their learning. 86.8% of the respondents are in agreement with this proposition. The results indicate that these factors influence students' perception of the use of ICT in their learning. In the

next discussion, presents the Influence of perceived usefulness of ICT in learning: perceived usefulness (PU).

#### 4.6.3 Influence of perceived usefulness of ICT in learning: perceived usefulness (PU)

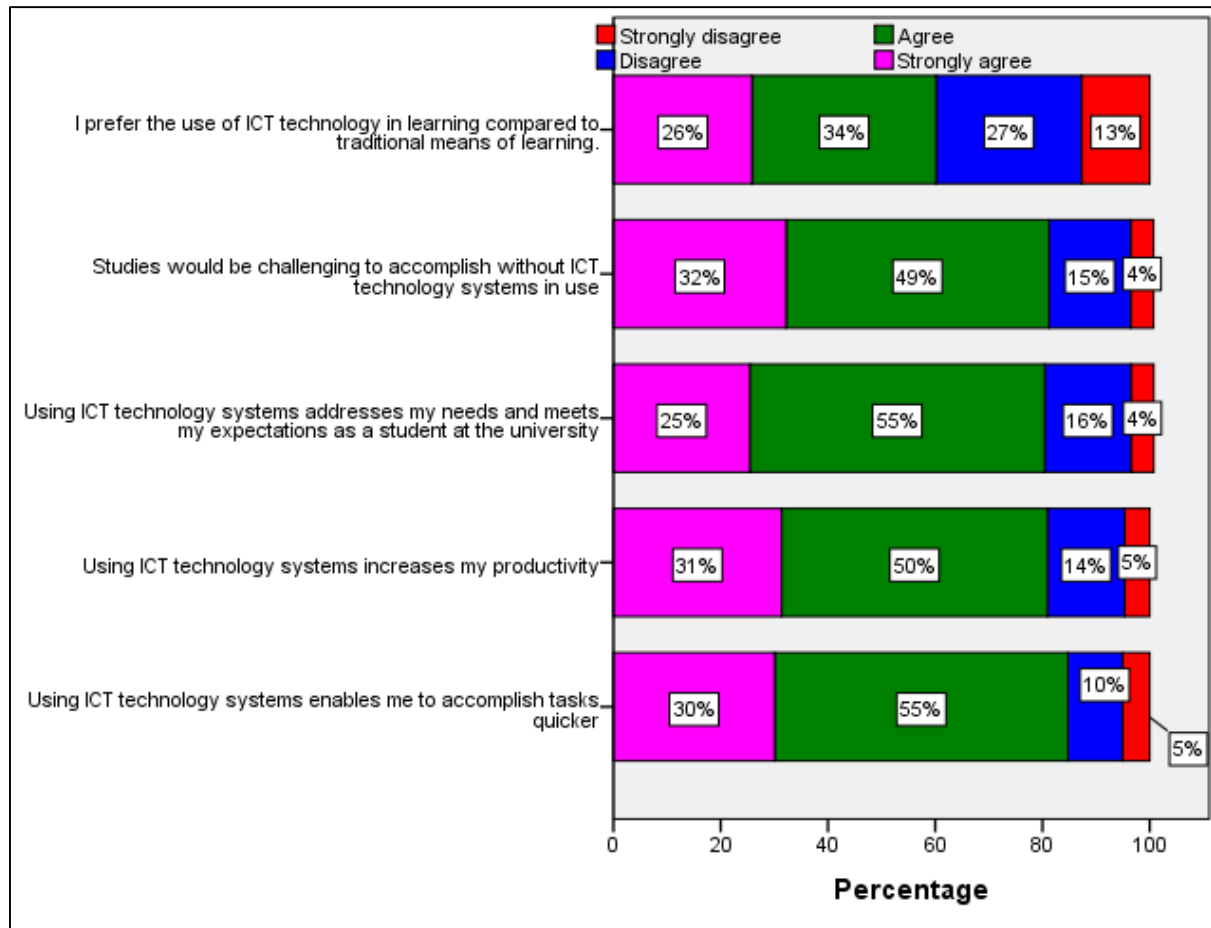


**Figure 4-5: Measuring perceived usefulness (PU)**

In figure 4-5, the clustered bar chart shows that the respondents were in agreement (agree to strongly agree) with all the measures of perceived usefulness (PU). The results show that most of the respondents are in favour of ICT technology such as e-learning compared to the traditional method of teaching and learning, as indicated 34% agree, and 26% strongly agree. However, not all students are in complete favour of using ICT as a method for teaching and learning. This could be due to some discrepancies that some communities are facing, such as poor service delivery, and poor ICT infrastructure, which is also known as the digital divide.

Although 40% of the respondents feel that they prefer the traditional method of teaching and learning, the respondents feel that their studies would be challenging without the use of ICT technology. The results show that 81% are in agreement (49% agree to, 32% strongly agree) with the proposition. This concurs to the majority of the respondents that indicated that using ICT

technology systems addresses their needs and meets their expectations as students at the university. This is of no small percentage, 80% of the respondents were in agreement. This shows that there are services and facilities that are in place; however, there is a small margin for improvement. 20% of the respondents were in disagreement (16% disagree to, 4% strongly disagree) with this proposition.

Furthermore, a significant margin of respondents indicated that ICT technology increases their productivity and helps them to accomplish their tasks quicker. This shows that ICT has a significant impact on students' career. However, a lack of skills or training will leave many in a disadvantage position comparing to their counterparts. 81% were in agreement that ICT increases their productivity, and 85% were in agreement that ICT helps with accomplishing their task quicker. The following pie chart gives an aggregate of measuring perceived usefulness (PU).

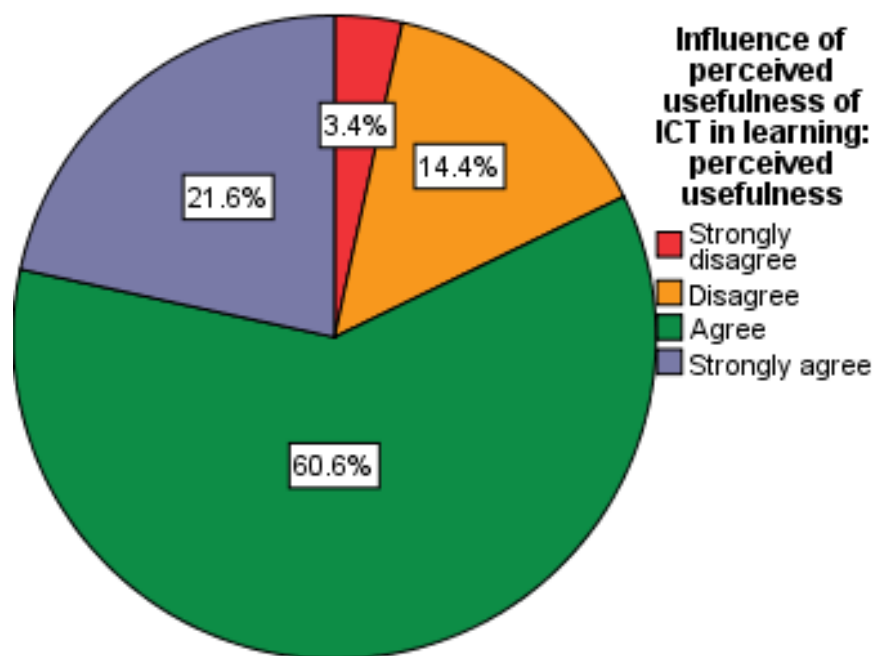


**Figure 4-6: Measuring perceived usefulness (PU)-Aggregate pie chart**

The pie chart in figure 4-6 shows that in general show that most of the students agreed with the propositions measuring the perceived usefulness. The perceived usefulness of the use of ICT in their learning (60.6%) agree, followed by those who strongly agreed (21.6%), the third-highest percentage disagreed (14.4%) whereas only (3.4%) strongly disagreed with this proposition. This indicates that the perceived usefulness of ICT has a significant impact on students' intention to use ICT in their learning. The respondents are in agreement with this proposition (Agree to strongly agree). However, the stakeholders should be in the position to engage communities, provide skills development and funding where resources are needed. In the next discussion,

presents the Influence of perceived ease of use of ICT on learning: perceived ease of use (PEOU).

#### 4.6.4 Influence of perceived ease of use of ICT on learning: perceived ease of use (PEOU)

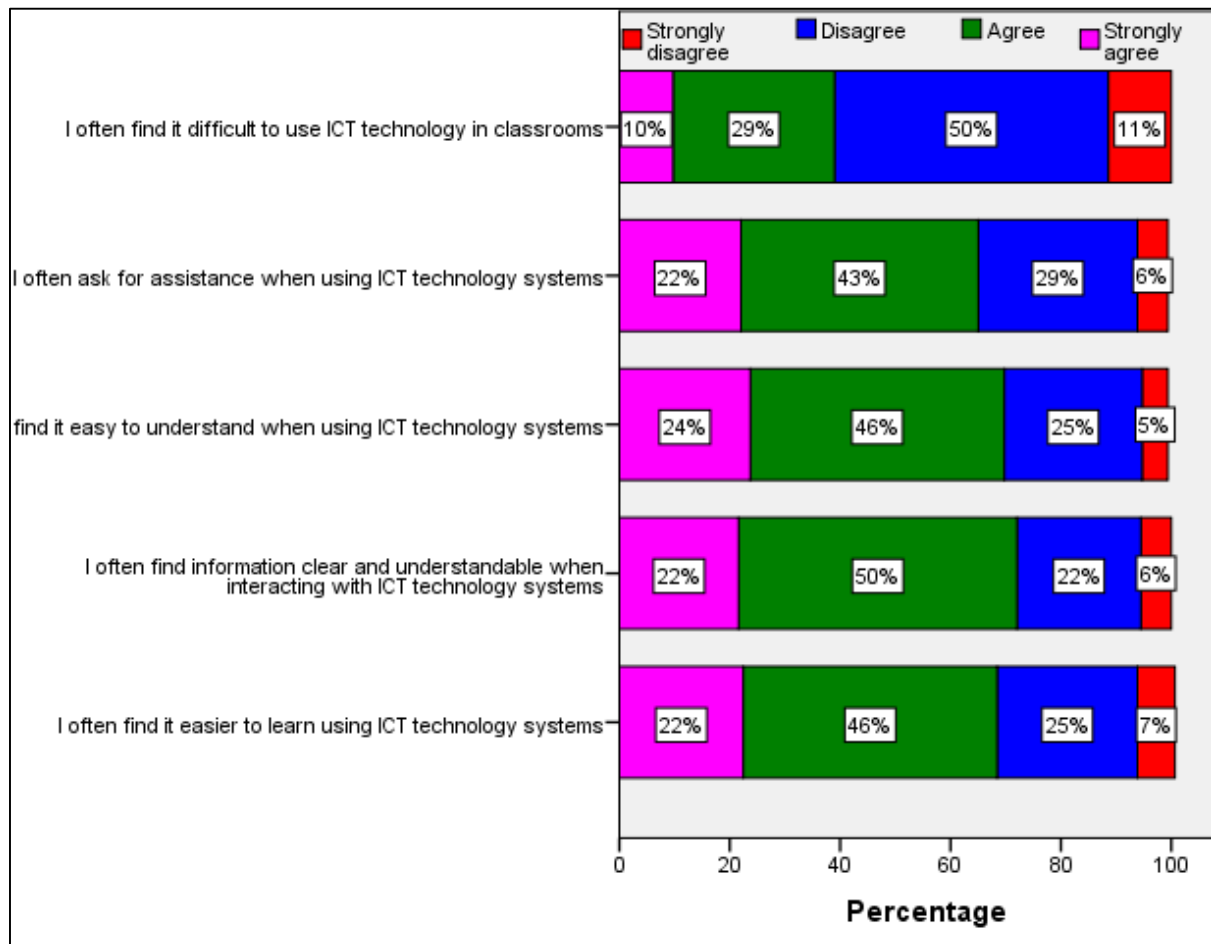


**Figure 4-7: Measuring perceived ease of use (PEOU)**

In figure 4-7, the clustered bar chart shows that the respondents were in agreement (agree to strongly agree) with all the measures of perceived ease of use (PEOU). In the results, most of the respondent were in disagreement with regards to finding ICT technology challenging to use in classrooms. This shows that 50% of the respondents familiar with using ICT systems in the classroom, such as computers and laptops. However, there is a small to moderate size group that feels otherwise (29% agree to, 10% strongly agree) with this proposition. Students tend to ask for assistance due to weak ICT skills, a significant response from respondents indicated that they seek assistance with using ICT technology (43% agree to, 22% strongly agree) with this proposition. However, most respondents do find the content given to them more accessible to understand when using ICT technology systems. 46% of the respondents agreed, and 24%

strongly agree with this proposition. Students often find information clear and understandable when interacting with ICT technology systems. This could be that students are able to make use of the internet to find relevant information or find educational videos on social platforms such as YouTube. The clustered bar shows that 50% agree and 22% strongly agreed. The result also shows that most students find it easier to learn with using ICT technology. This concurs with the previous proposition, 68% of the respondents were in agreement (Agree to, strongly agree). The following pie chart gives an aggregate of measuring perceived ease of use (PEOU).

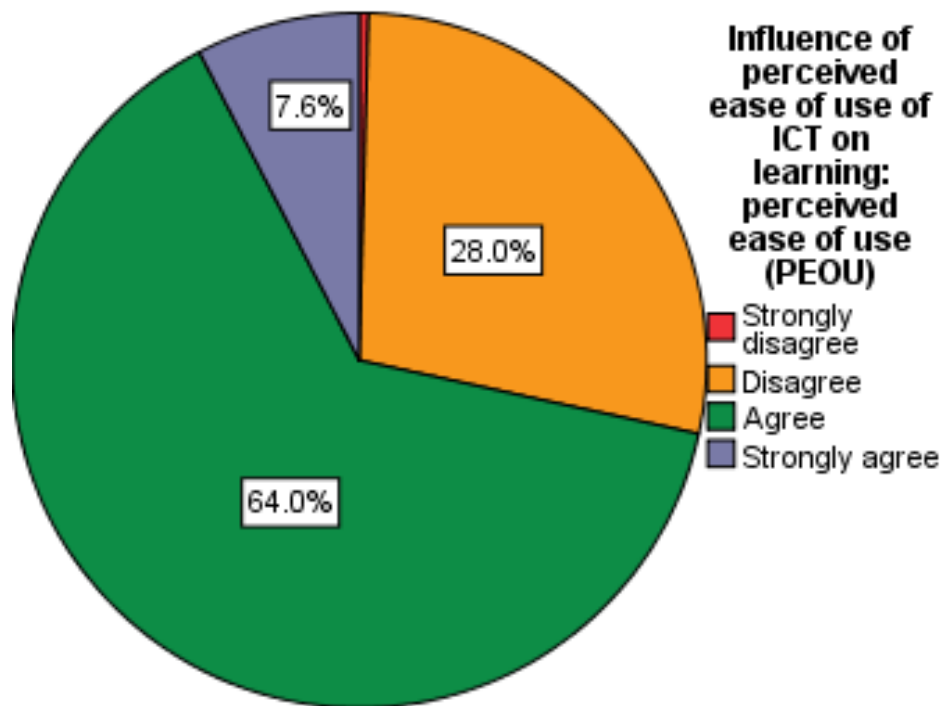


**Figure 4-8: Measuring perceived ease of use (PEOU)-Aggregate pie chart**

The pie chart in figure 4-8 shows that in general, most of the students agreed with the propositions measuring the perceived ease of use. The perceived ease of use of ICT in their learning (64%) agree, followed by those who disagreed (28%), the third-highest percentage strongly agree (7.6%) whereas only (1%) strongly disagreed with this proposition. The result shows that most respondents are in favour of using ICT as a means for learning; however, the results also show that 35.6% of students indicated that they have no prior experience on using ICT technology, such as computers. This could be the cause that many students require assistance with ICT systems and are having some difficulty using these systems. In the next discussion, presents strategies that will influence students' perception of the role of ICT.

#### 4.6.5 Strategies that will influence students' perception of the role of ICT: behavioural intention (BI)

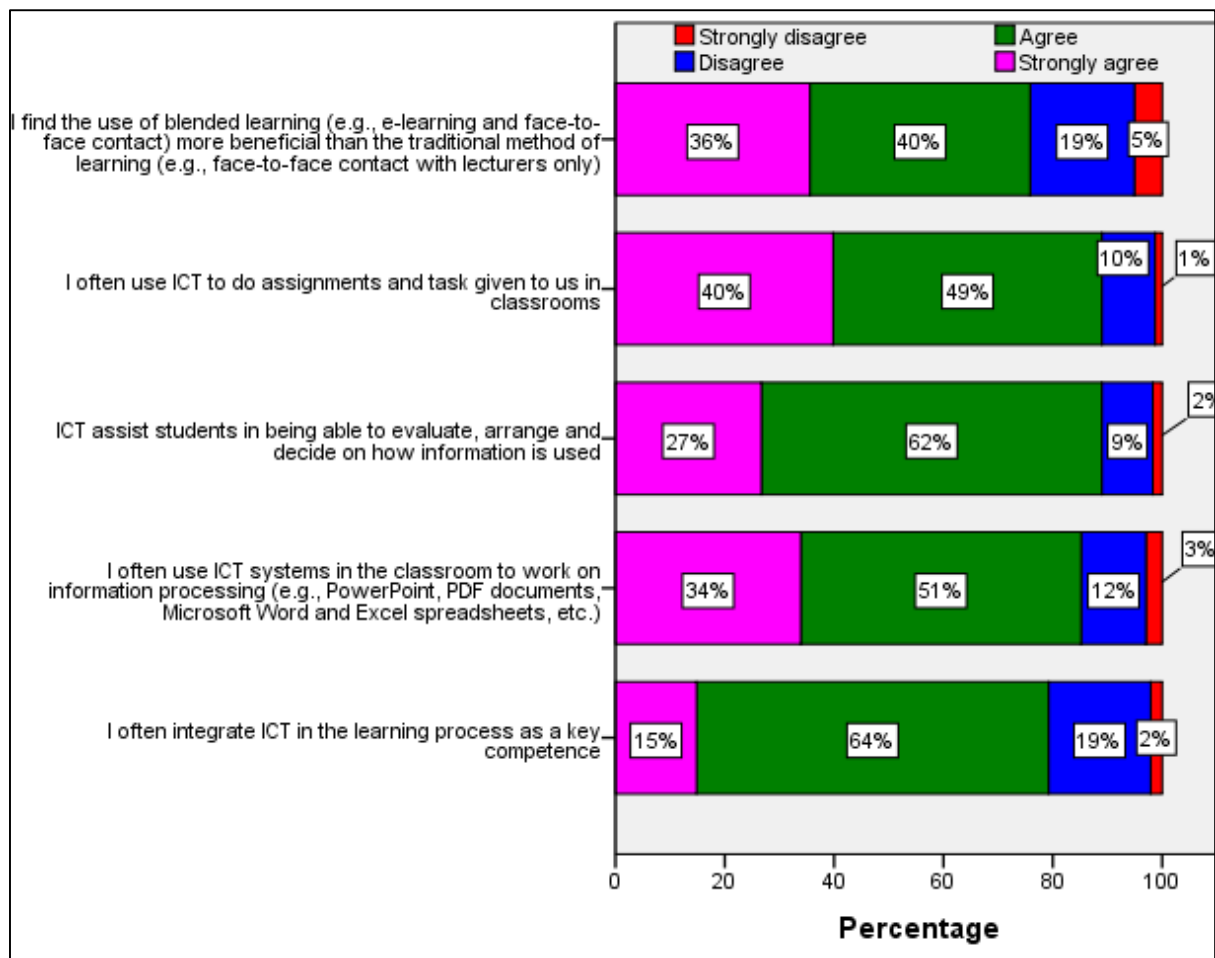


**Figure 4-9: Measuring behavioural Intention (BI)**

In figure 4-9, the clustered bar chart shows that the participants were in agreement (agree to strongly agree) with all the measures of behavioural intension (BI). The results of the first proposition show that a significant amount of the respondents are in favour of using blended learning method for teaching and learning. Hiralaal (2012) observed a study on fifty-five undergraduate students at UNISA. Forty-two out of fifty-five respondents strongly agreed that blended learning motivated them in their learning, representing 76% of the total sampling group and only nine agreed. Concurring to this study, 76% of the respondents are in agreement (40% agree to 36% strongly agree); However, there are respondents that were not in favour with blended learning and preferred using traditional means for teaching and learning. The results show that most of the respondents (49% agree to, 40% strongly agree) use ICT to do their assignments and tasks given to them. Followed by (62% agree to 27% strongly agree) that use ICT systems in the classrooms to work on information processing (e.g., PowerPoint, PDF documents, Microsoft Word and Excel spreadsheets, etc.). Lastly, the majority on the respondents

were in agreement (64% agree to, 15% strongly agree) with the proposition, I often integrate ICT in the learning process as a critical competence. The following pie chart gives an aggregate of measuring behavioural intention (BI).

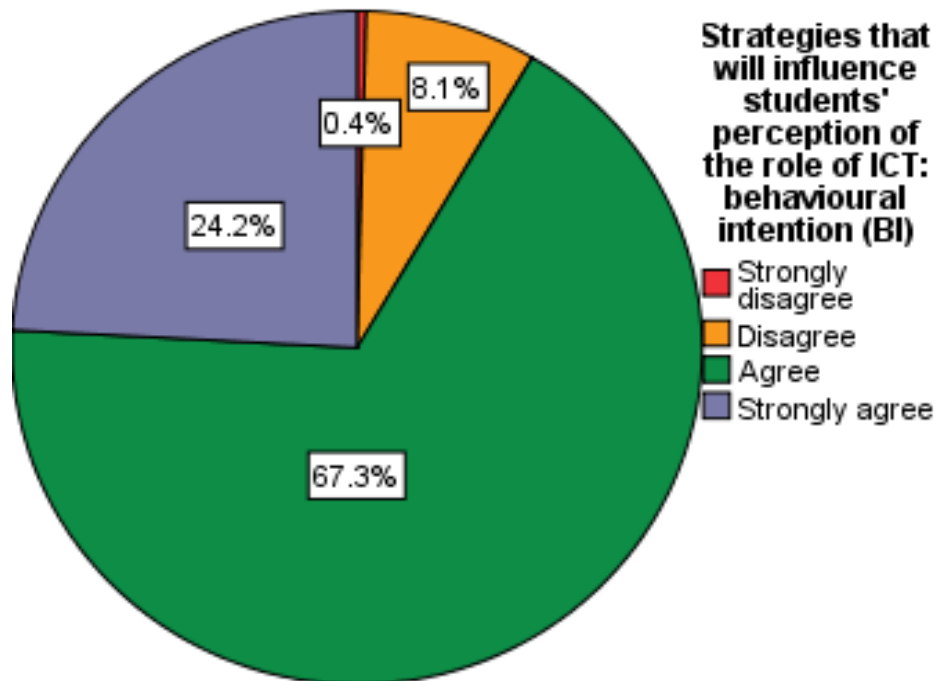


**Figure 4-10: Measuring behavioural intention (BI)-Aggregate pie chart**

The pie chart in figure 4-10 shows that most of the students agreed with the propositions measuring the behavioural intention (67.3%), followed by those who strongly agreed (24.2%), the third-highest percentage disagreed (8.1%) whereas only (0.4%) strongly disagreed with this proposition. ICT has a significant influence on students' behavioural intention to use these systems in their learning. In the next discussion, presents the results on measuring ICT actual system use.

#### 4.6.6 Measuring ICT actual system use

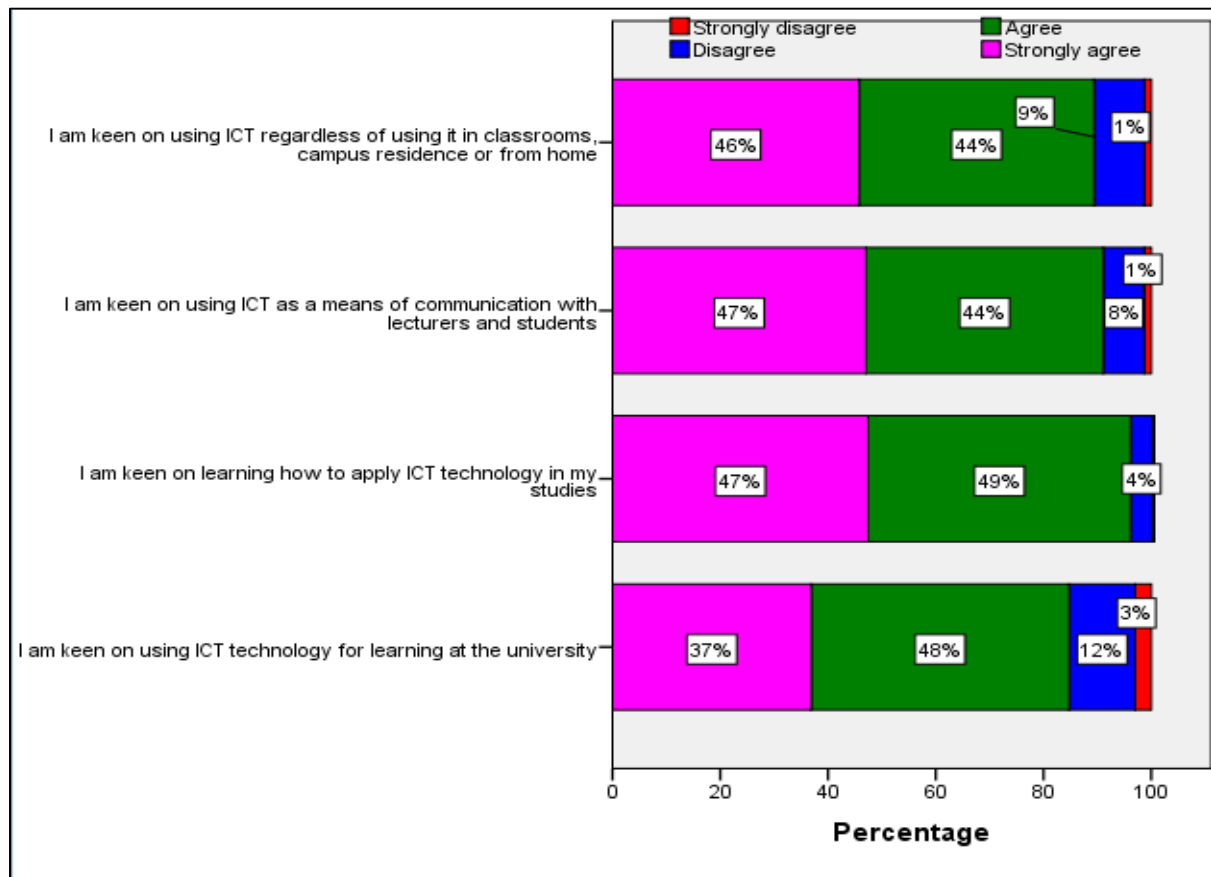


**Figure 4-11: Measuring ICT actual system use**

In Figure 4-11, the clustered bar chart shows that the participants were in agreement (agree to strongly agree) with all the measures of ICT actual systems use. The result of measuring ICT actual system use indicated that most students are keen on using ICT regardless of using it in the classroom, campus residence or from home. 46% were in strongly agree, 44% agree with this proposition. Majority of respondents also indicated that they are keen on using ICT as a means for communication with lecturers and students, 47% strongly agreed, following a 44% that agree. 49% of the respondents indicated that they are keen on learning how to use ICT technology in their studies, followed by 47% that strongly agree, in total 96% of the respondents were in agreement. Lastly, the results show that students are keen on using ICT technology for their learning, 83% were in agreement; however, there is a slight disagreement in the proposition.

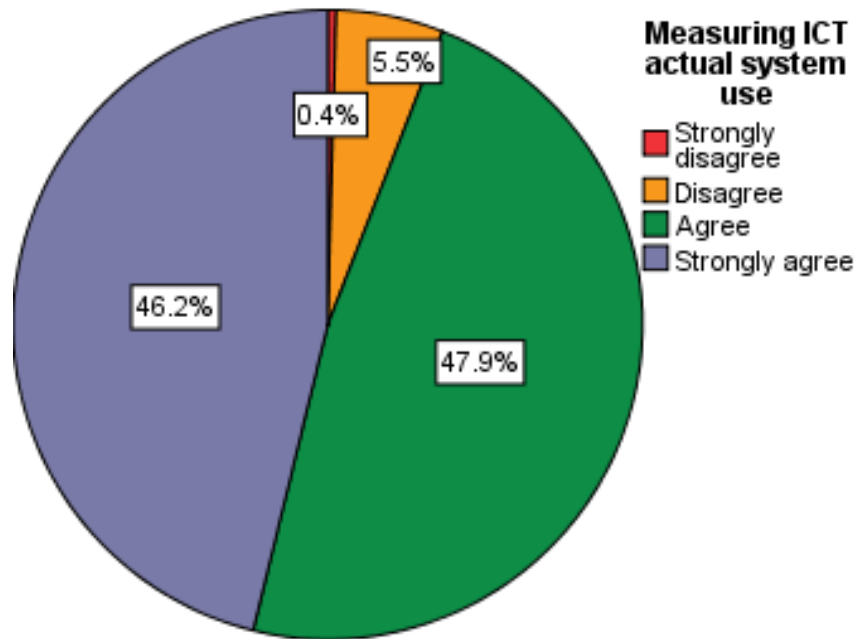


**Figure 4-12: Measuring ICT actual system use-Aggregate pie chart**

The pie chart in figure 4-12 shows that the majority of the students agreed with the propositions measuring ICT actual systems use (47.9%), followed by those who strongly agreed (46.2%), the third-highest percentage disagreed (5.5%) whereas only (0.4%) strongly disagreed with this proposition. In the next discussion, the data analysis presents the relationship between variable followed by the conclusion of this study.

## 4.7 Conclusion

In chapter four, presented the data that has been analysed and interpreted. In Chapter five will present with the discussion, recommendation and conclusion of the data analysed, including the interpretation. The study will provide possible recommendations that can be considered in order to improve the student's perceptions of the role of ICT in their learning. The ultimate aim of this study is to provide relevant stakeholders with possible solutions and recommendation for further studies in this field.

## **Chapter five**

### **5.1 Introduction**

In the preceding chapter, discussed the findings of the data analysed and data interpretation. In chapter one, the researcher stated the problem statement, questions and the objectives of the study. The variables that were used for this study examined Attitude towards use (U), External Variables (EV), Perceived Usefulness (PU), Perceived ease of use (PEOU), Behavioural Intention (BI) and ICT Actual system use. The final chapter will restate the problem statement, and the method used, followed with the summary of findings and discussions, conclusion, the recommendation for future study, delimitation of the study and the summary of the chapter.

### **5.2 Summary of the study**

In chapter one, the researcher presented the problem statement as limited research studies have ventured into examining students' perception on the use of ICT in their learning by academics in South African higher education institutions, despite evidence that points out to lower ICT usage by academics (Makura, 2014). However, researchers are of the view that students do not use ICT in their learning successfully (Sarfo & Ansong-Gyimah, 2011; Woreta *et al.*, 2013). Furthermore, Ang'ondi (2011) advocated the reason for slow ICT in learning infusion proposed in the literature, are limited funding, inadequate development opportunities for teachers, negative attitudes towards technologies, and lack of students' perception. The purpose of this study is to investigate students' perception of the role of ICT in their learning at the North-West University Mahikeng campus.

This study adopted a quantitative method as opposed to qualitative and mixed-method approach. An online survey was designed to collect the data obtained from all the respondents, section A of the survey, the researcher used a short-ended question, section B was based on the Technology Acceptance Model (TAM) using a four-point Likert scale. The study used the Statistical Product and Service Solutions (SPSS) model 26 to analyse the data collected from the 236 participants that completed the online survey.

The results show that out of the 236 respondents that have participated, 45.3% were male respondents, and 54.7% were female respondents. The results indicated there is a positive change in correlations between variables U, PEOU, BI and PU that will lead to an increase in ICT actual system use. However, the external variables (EV) had no significant correlation with ICT actual system use ( $p\text{-value} > 0.05$ ). As indicated in the preceding chapters, this study addressed

the research questions and the objectives of this study. In the next discussion, presents the finding and discussion.

### **5.3 Summary of findings, discussion and conclusion**

The findings from the data analysed are related to students' perception and how they perceive ICT factors in the classroom and its capabilities to the users of technology in higher education. The evidence from the results shows that students are a vital cadre in higher education and that their perceptions play a crucial role in offering feedback and consumer insight into the integration of ICT technology for government and stakeholders.

#### **5.3.1 Students' perception of the role of ICT in learning**

The first objective is to examine students' perception of the role of ICT in their learning which measures attitude towards use. The results indicated that there is a correlation between attitudes towards use (U) that will lead to a positive increase in ICT actual system use. The results are in agreement with Bonde (2018), the authors indicate that ICT promotes autonomy in learning and that students assume responsibility for how they approach their studies. Students indicated that ICT aid them in their learning, improves their performance, therefore making the use of ICT in their learning crucial importance for students in higher education. However, figure 4-1 indicated that there are students who do not share the same views as others. Thus implies that there are students who prefer the traditional methods of teaching and learning. According to Kirkwood and Price (2005) observed in their study that students are willing to adopt the use of ICT in their learning after they understood why ICT could be useful to them. In concluding, if students are given the opportunity to familiarise themselves with ICT technology, thus will change their perception and their attitude towards use.

#### **5.3.2 Factors that influence students' perception of the role of ICT in their learning**

The second objective is to examine the factors that influence students' perception of the role of ICT in their learning which measures external variables (EV). The results show that external variables (EV) are not significantly correlated with ICT actual system use ( $p\text{-value} > 0.05$ ). However, even though the result indicates that most of the respondents are in agreement, there are respondents who are opposed to this view. Bhero (2012) indicated that students that are living in remote areas are usually experiencing challenges such as lack of resources, weak ICT skills, ICT infrastructure and low bandwidth connection. Concurring to Bhero (2012), the result shows that there are students that are experiencing these challenges such as mandatory ICT infrastructure, and electricity connection.

Furthermore, students were in agreement that prior experience, exposure and training are factors that significantly influence students' perception in using ICT in their learning. In earlier research, Duan *et al.* (2008) advocated that these factors can influence individual attitude towards using ICT, and will keep people away from using ICT systems. These factors that need intervention from the government and other relevant stakeholders; if this is ignored, it will impact students' negatively in their careers. This put students in a disadvantage position in order for them to fill in the gaps they need to extra courses because of a lack of ICT skills and exposure to technology. This will create a negative attitude towards use. According to Bhero (2012), once people have a negative attitude towards something, it becomes difficult to change their mind-set. This implies that students are aware that these elements are contributing factors towards students' perception and using ICT in their learning. In conclusion, in order to alleviate these challenges, this will need attention from the government and all relevant stakeholder to create awareness campaigns and to better support rural development ICT resources.

### **5.3.3 Perceived usefulness (PU) of ICT in their learning**

In the third objective is to examine the perceived usefulness of ICT in learning. The results indicated that there is a correlation between perceived usefulness (PU) that will lead to a positive increase in ICT actual system use. The results concur to the findings of Davis (1986), the author indicated that perceive usefulness are strong indicators that an individual are willing to adopt ICT technology systems. Thus implies that if a user believes that something such as ICT is useful, this will influence their perception towards using ICT. However, some respondents do not share the same view; therefore, this might need to be improved.

### **5.3.4 Perceived ease of use (PEOU) of ICT in their learning**

In the third objective is to examine the perceived ease of use (PEOU) of ICT in learning. The results indicated that there is a correlation between PEOU that will lead to a positive increase in ICT actual system use. The results concur to the findings of Davis (1986), the author indicated that PEOU is strong indicators that an individual willing to adopt ICT technology systems. Furthermore, the researcher indicated that PEOU measures the degree to an individual's belief that if something is without effort in an attempt to use. The results show that some students find it difficult to use ICT systems and require assistance. Research shows that students experience difficulties in their studies when performing numerous tasks and assignments in their learning in diverse subjects (Huang *et al.*, 2020a). Therefore, it is reasonable to assume that once students' perception of using ICT technology to be an effortless attempt to use, they would be influenced to use ICT technology in their learning. However, the results show that there are students that are

experiencing challenges. In conclusion, specific areas will need to be addressed for first-years to attempt to use ICT in their learning effortlessly.

### **5.3.5 Strategies that improve the influence of students' perception in their learning**

The fourth objective is to examine strategies that will influence students' perception of the role of ICT in their learning which measures behavioural intention (BI). The results indicated that there is a correlation between BI that will lead to a positive increase in ICT actual system use. The significant finding of this study shows that strategies such as blended learning positively influence students' perception and their behavioural intention to use ICT in their learning. According to Sharpe *et al.* (2006) Students participated in a study using blended learning, and the outcome shows that students actually responded in an overwhelmingly positive way toward this method of teaching and learning. However, there is respondent that prefer traditional methods of teaching and learning. Thus implies that students do appreciate the traditional face-to-face teaching; however, they need to realise the role of ICT embedded in classroom settings.

### **5.3.6 Measuring ICT actual systems use**

This study shows that these correlations imply that a positive change in U, PU, PEOU, and BI will lead to an increase in ICT actual system use. However, the results show that EV is not significantly correlated with ICT actual system use ( $p\text{-value} > 0.05$ ). The results imply that there is a positive change in students' perception and ICT actual system use, students have an overall positive intention to use ICT in their learning. However, the results also show that there is a need for improvement.

## **5.4 Conclusions**

The aim of this study added to literature with what is known and what is not known. This study received an overwhelming number of responses from students in a short period of time. The study shows that students have a positive influence on using ICT in their learning. The outcome of this study generalised the views of first-year students from the NWU Mahikeng campus. The objective of this study examines students' perception of the role of ICT in their learning. This study was motivated around the lack of studies that surrounds this phenomenon. Research shows that there are limited studies done on examining students' perception on ICT in their learning by academics in South African higher educational institutions, despite substantial sources that point out that there is low ICT use by academics (Makura, 2014:46).

Despite the factors that may influence students' perception of using ICT as a means for learning or using traditional means for teaching and learning, students perceive ICT as useful. From these

results, it could be concluded that the strategy of employing ICT in teaching and learning can also play a critical role in students' perception in higher education. However, ICT service providers often focus on the technical and maintenance side of ICT systems. Research shows that when new technology systems are developed and introduced, this does not necessarily mean that these systems will be adopted (Obinkyereh, 2017). However, Davis (1989) indicated that users perception and behavioural intension to use information systems influence their adoption of new systems.

The study reveals that there are respondents that do not have any prior experience in using ICT systems such as computers and did not receive any training on using ICT systems. Further research on students' perception and ICT in higher education may reveal factors that influence user adoption to ICT in their learning.

ICT can be useful in enhancing the quality of education by strategically employing numerous levels of training. However, without students' perception will hinder the successful implementation of ICT into higher education. Relevant stakeholders ought to address the challenges that students are exposed to, providing adequate training for all students. Finally, using ICT will enhance students learning experience; this will help build a successful career in the computer age era.

## **5.5 Recommendations**

- Increase exposure and training through awareness campaigns; this will play a vital role to raise ICT literacy levels and bridging the digital divide.
- Earlier exposure and training will change the individual mind-set towards using ICT in learning. Research shows that if users have prior experience and exposure, this will create a positive mind-set towards ICT. Government intervention is needed more in rural areas if these areas are not well equipped with resources such as electricity and ICT infrastructures thus will leave the vast population behind and will only further increase the digital divide.
- To influence perceived usefulness and perceived ease of use of ICT in learning, the university needs to implement compulsory ICT courses for the first years. The university should provide a more practical approach that will teach students step by step processes. Once students understand the usefulness and effortless attempt to use ICT systems will positively influence their overall outcome.
- Research shows that students responded in an overwhelmingly positive way toward a blended learning-teaching environment. Government and stakeholders can implement this style of teaching in primary and secondary schools.

## **5.6 Future study recommendations**

The study was done in Mahikeng at the North-West University campus, which is the capital of the North West province. To expand the scope of the study to include other universities in other regions could establish how students perceive ICT in their learning at a national scale, this could better inform national policymakers. The study could be replicated by conducting research across-universities in other regions of the country.

For further studies, this research used a quantitative approach as opposed to a qualitative and mixed method. To expand on the study, a mixed-method approach will be more beneficial, since this approach include both qualitative and quantitative research. This will increase the depth of understanding of students' perception because it will be using the strength of both research methodologies.

## **5.7 Delimitation of the study**

The delimitation of this study focused on first-year students from the Mahikeng campus in the faculty of economics and management sciences (FEMS) only and followed a quantitative approach. The study conducted a non-probability purposive sampling method. The FEMS faculty was purposely chosen, in order to target appropriate respondents from North-West University Mahikeng campus, using an online survey that was administered through efundi. The purpose of choosing the Mahikeng campus is due to the nature and the topic of the study. Mahikeng is considered a semi-rural town and most students enrolled at the university come from disadvantage backgrounds. This study used a census technique by sending the invitations with the survey link to prospective participants in the FEMS faculty; the FEMS faculty is the largest faculty on the Mahikeng campus. The boundaries of this study excluded students from other faculties, including staff members, and students from other campuses. The purpose of this study is to examine students' perception of the role of ICT in their learning. However, there could be other factors that could influence students' perception and the use of ICT in their learning. Data was collected using a survey instrument that was administered through efundi to students in the FEMS faculty.

## **5.8 Summary of the chapter**

The primary objective of this study was to examine students' perception of the role of ICT in their learning. Chapter five provided the findings and discussions from the data that was analysed. The findings presented evidence that there is a positive change in correlation between variables, attitude towards use (U), perceived usefulness (PU), perceived ease of use (PEOU), behavioural intention (BI) that will influence actual ICT system use at the North-West University Mahikeng

campus. However, the results show that external variables (EV) are not significantly correlated with ICT actual system use. The conclusion of this chapter indicated that there some students that do not have prior experience with computer systems, and there are students that did not receive any training on how to use ICT as a means for learning. However, the results show that students perceive to have a positive influence on using ICT in their learning. Finally, this chapter concluded with the recommendation for universities, government, stakeholders and recommendations for further studies in a similar field.

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## Annexure A: Questionnaire

*The Demographic questions in a survey allow the researcher to gain insight into the characteristic (e.g. gender, age, level of education, ICT experience, etc.) on their participants. These questions provide context for the collected survey data, allowing researchers to describe their participants and better analyse their data.*

**Please complete the questionnaire below by indicating with a CROSS [X] in the appropriate box.**

|           |                                                                                                            |                     |  |
|-----------|------------------------------------------------------------------------------------------------------------|---------------------|--|
| <b>A1</b> | <b>Please specify gender?</b>                                                                              | <b>Male</b>         |  |
|           |                                                                                                            | <b>Female</b>       |  |
| <b>A2</b> | <b>Please specify age group?</b>                                                                           | <b>18 – 24</b>      |  |
|           |                                                                                                            | <b>25 – 34</b>      |  |
|           |                                                                                                            | <b>35 – 44</b>      |  |
|           |                                                                                                            | <b>45 and above</b> |  |
| <b>A3</b> | <b>Please specify the level of Higher education?</b>                                                       | <b>Certificate</b>  |  |
|           |                                                                                                            | <b>Degree</b>       |  |
|           |                                                                                                            | <b>Honours</b>      |  |
|           |                                                                                                            | <b>Masters</b>      |  |
|           |                                                                                                            | <b>PhD</b>          |  |
| <b>A4</b> | <b>Please specify self-awareness level about ICT technology?</b>                                           | <b>Very High</b>    |  |
|           |                                                                                                            | <b>High</b>         |  |
|           |                                                                                                            | <b>Not aware</b>    |  |
|           |                                                                                                            | <b>Low</b>          |  |
|           |                                                                                                            | <b>Very Low</b>     |  |
| <b>A5</b> | <b>Do you own any device (PC or Laptop)?</b>                                                               | <b>Yes</b>          |  |
|           |                                                                                                            | <b>No</b>           |  |
| <b>A6</b> | <b>Do you have any prior experience of using computers or laptops before enrollment at the university?</b> | <b>Yes</b>          |  |
|           |                                                                                                            | <b>No</b>           |  |

|           |                                                                                |                  |  |
|-----------|--------------------------------------------------------------------------------|------------------|--|
| <b>Q7</b> | <b>Did you receive any training on how to use ICT as a means for learning?</b> | <b>Yes</b>       |  |
|           |                                                                                | <b>No</b>        |  |
| <b>Q8</b> | <b>How would you rate your confidence in using ICT technology?</b>             | <b>Very High</b> |  |
|           |                                                                                | <b>High</b>      |  |
|           |                                                                                | <b>Moderate</b>  |  |
|           |                                                                                | <b>Low</b>       |  |
|           |                                                                                | <b>Very Low</b>  |  |

## SECTION 2

In the following statements below indicate the level of agreement by using a CROSS [X] in the appropriate Option.

| STUDENTS' PERCEPTION OF THE USE OF ICT IN LEARNING:<br>ATTITUDE TOWARD USE (A) |                                                                                                                  | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                                                              | The use of ICT improves learning and performance                                                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                                                              | The use of ICT aid in learning and improve my schooling career                                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                                                              | The use of ICT has a significant impact on end-user performance                                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                                                              | The use of ICT technology systems can improve the quality of education                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5                                                                              | I find ICT teaching and learning methods more effective than using traditional methods of teaching in classrooms | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6                                                                              | The use of ICT helps with concentration in classrooms and in learning                                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7                                                                              | The use of ICT helps students remember content that they have learnt                                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8                                                                              | The use of ICT helps in understand information and what was taught in classrooms                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9                                                                              | The use of ICT influence students to feel more autonomous (e.g. independent) in their learning                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In the following statements below indicate the level of agreement by using a CROSS [X] in the appropriate Option.

| FACTORS THAT INFLUENCE STUDENTS' PERCEPTION OF THE USE OF ICT IN LEARNING: EXTERNAL VARIABLES (EV) |                                                                                                                    | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                                                                                  | There are a sufficient number of Laptops/computers available for students                                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                                                                                  | There is a lack of academic models on how to use ICT for learning                                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                                                                                  | Most lecturers are not in favour of using ICT in classrooms                                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                                                                                  | Exposure and training on ICT systems increase students confidence in using ICT systems in their learning           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5                                                                                                  | Having prior experience in the computer makes it easier for me to implement ICT in learning                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6                                                                                                  | ICT technology modules are effortlessly implemented in schooling curricula                                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7                                                                                                  | Internet connection is steady and readily available on campus                                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8                                                                                                  | Electricity in our area is steady enough to use ICT technology                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9                                                                                                  | There are mandatory infrastructure in place to use ICT technology                                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10                                                                                                 | I often find it challenging to collaborate with other students and to interact with lecturers using ICT technology | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In the following statements below indicate the level of agreement by using a CROSS [X] in the appropriate Option.

| INFLUENCE OF PERCEIVED USEFULNESS OF ICT IN LEARNING: PERCEIVED USEFULNESS (PU) |                                                                                                          | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                                                               | Using ICT technology systems enables me to accomplish tasks quicker                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                                                               | Using ICT technology systems increases my productivity                                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                                                               | Using ICT technology systems addresses my needs and meets my expectations as a student at the university | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                                                               | Studies would be challenging to accomplish without ICT technology systems in use                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5                                                                               | I prefer the use of ICT technology in learning compared to traditional means of learning.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In the following statements below indicate the level of agreement by using a CROSS [X] in the appropriate Option.

| INFLUENCE OF PERCEIVED EASE OF USE OF ICT ON LEARNING: PERCEIVED EASE OF USE (PEOU) |                                                                                                | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                                                                   | I often find it easier to learn using ICT technology systems                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                                                                   | I often find information clear and understandable when interacting with ICT technology systems | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                                                                   | I find the content easy to understand when using ICT technology systems                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                                                                   | I use ICT technology systems without the need for assistance                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5                                                                                   | I often find it difficult to use ICT technology in classrooms                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In the following statements below indicate level of agreement by using a CROSS [X] in the appropriate Option.

| STRATEGIES THAT WILL INFLUENCE STUDENTS' PERCEPTION OF THE ROLE OF ICT: BEHAVIOURAL INTENTION (BI) |                                                                                                                                                                                         | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                                                                                  | I often integrate ICT in the learning process as a key competence                                                                                                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                                                                                  | I often use ICT systems in the classroom to work on information processing (e.g., PowerPoint, PDF documents, Microsoft Word and Excel spreadsheets, etc.).                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                                                                                  | ICT assist students in being able to evaluate, arrange and decide on how information is used                                                                                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                                                                                  | I often use ICT to do assignments and task given to us in classrooms                                                                                                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5                                                                                                  | I find the use of blended learning (e.g., e-learning and face-to-face contact) more beneficial than the traditional method of learning (e.g., face-to-face contact with lecturers only) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In the following statements below indicate the level of agreement by using a CROSS [X] in the appropriate Option.

| MEASURING ICT: ACTUAL SYSTEM USE |                                                                                            | Strongly disagree     | Disagree              | Agree                 | Strongly agree        |
|----------------------------------|--------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                                | I am keen on using ICT technology for learning at the university                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2                                | I am keen on learning how to apply ICT technology in my studies                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3                                | I am keen on using ICT as a means of communication with lecturers and students             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4                                | I am keen on using ICT regardless of using it in classrooms, campus residence or from home | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**THANK YOU FOR PARTICIPATING AND COMPLETING THE SURVEY QUESTIONNAIRE.**  
**YOUR SUPPORT IS HIGHLY APPRECIATE**

## Annexure B: Informed Consent

Dear participant:

You are invited to participate in our survey on students' perception of the role of ICT in their learning at the NWU Mahikeng campus. In this survey, all student will have an equal chance to participate; however, once the desired sample size is reached, the survey will be closed. It will take approximately 10 - 15 minutes to complete the questionnaire. Your participation in this study is entirely voluntary. There are no foreseeable risks associated with this project.

However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is crucial for us to learn your opinions on ICT. Your insight will contribute tremendously to this study. Your survey responses will be strictly confidential, and data from this research will be reported only in the aggregate. All responses are confidential, and no personal information linking you to this specific questionnaire (e.g. student number, name, address) is included. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Emile Jeremy Mather at 076 143 4430 / 018 389 2016 or by e-mail at the e-mail address specified below.

The first sections of the survey are based on the demographics. Demographic questions in a survey allow the researcher to gain background information (e.g. gender, age, level of education, level of ICT experience, etc.) on their participants. These questions provide context for the collected survey data, allowing researchers to describe their participants and better analyse their data.

By continuing to complete this survey, I confirm that I have read the above description, I have been informed that it is a low-risk study, and I am aware of the purpose of the study. I voluntarily agree to take part in this study, and by completing this questionnaire, I give consent for the information being used in aggregate form. **PLEASE CLICK THE CHECKBOX IF YOU AGREE.**

☒ I Agree

Yours Sincerely

Emile Mather

Cell: 076 143 4430

Tel: 018 389 2016

E-mail: [29231140@nwu.ac.za](mailto:29231140@nwu.ac.za)

## **Annexure C: Invitation Letter**

### **INVITATION LETTER**

Dear Participant,

My name is Emile Mather, and I am a graduate student at North-West University Mahikeng campus. For my final assessment, I am examining students' perception of the role of ICT in their learning at the NWU Mahikeng campus. You are asked to participate in the study because your insights with respect to the research question are to investigate Students' perception and the use of ICT technology in their learning.

You are a member at NWU Mahikeng campus, your understanding, experience and insights will enable this research to understand students' perception, the use of ICT technology and how does it influence students in their learning on campus. I am inviting you to participate in this research by completing the online survey.

The following questions will take approximately 15 – 20 minutes of your time. There will be no compensation for responding, nor is there any known risk involved. In order to protect the respondent's identity, there will be no personal information requested. A copy of the data collected will be provided to the supervisor of this study. If you are willing to volunteer, please complete the online survey as honestly as possible. Participating is strictly voluntary, and you may refuse to participate at any time.

Thank you for your time to assist with my research endeavours. The data collected will provide useful insight into students' perception. If you have any queries on this study, please feel free to contact the supervisor in the details provided below or me.

Yours Sincerely,

Emile Mather

Cell: 076 143 4430

Tel: 018 389 2016

E-mail: [matherej@gmail.com](mailto:matherej@gmail.com) / [29231140@nwu.ac.za](mailto:29231140@nwu.ac.za)

Supervisor: Prof Jan Meyer

E-mail: [Jan.Meyer@nwu.ac.za](mailto:Jan.Meyer@nwu.ac.za)

Co-Supervisor: Dr Martha Matashu

Tel: 018 389 2323/2614

E-mail: [Martha.Matashu@nwu.ac.za](mailto:Martha.Matashu@nwu.ac.za)

## **Annexure D: Permission to conduct research**

**PRIVATE BAG X2046**

**MMABABATHO**

**2735**

**From: Emile Jeremy Mather**

**Tel: 018 381 2016**

**Cell: 076 143 4430**

**Email Address: [matherej@gmail.com](mailto:matherej@gmail.com) / [29231140@nwu.ac.za](mailto:29231140@nwu.ac.za)**

**To: North-West University**

### **REQUEST FOR PERMISSION TO CONDUCT ACADEMIC RESEARCH**

I am currently working at North-West University as a Senior IT technician, and I am also a graduate student at North-West University, studying towards my Master of Business Administrations (MBA). I am working on my mini-dissertation. The purpose of this study is to examine students' perception, the use of Information and communication technology (ICT) and how does ICT technology influence them in their learning at NWU Mahikeng campus.

I am humbly requesting permission to conduct this research on campus. A questionnaire survey will be distributed to students at Mahikeng campus. The finding and recommendations will be made available to the North-West University upon completion.

Yours Sincerely

*Emile Mather*

Approval granted YES [ ] / NO [ ] for the student to conduct the study at North-West University Mahikeng campus

**Approval granted by:**

**Signature:**

**Date:**



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2 December 2020

### **Annexure E: Certificate of editing**

**TO WHOM IT MAY CONCERN,**

**I Medicine Magocha, confirm and certify that I have read and edited the entire Dissertation Students' Perception of the Role of ICT in Their Learning at the North-West University Mahikeng Campus by E J MATHER, Student number 29231140, submitted for the fulfilment of the Master of Business Administration (MBA) DEGREE with the NWU SCHOOL OF BUSINESS AND GOVERNANCE at the North-West University.**

**E J MATHER** was supervised by **Prof Jan Meyer** and Core-supervised by **Dr Martha Matashu** from North-West University.

I hold a bachelor's degree in languages and postgraduate degrees with a lot of research component and am qualified to edit such kind of academic work, aligning it to the requirements of the scholarship. However, the views expressed in the study remain the onus of the researcher (s).

Yours Sincerely

***D Tech Agric; Doctor of Business Leadership; MBA; Post-grad Dip in Telecoms; BA and Management of Training Diploma and Certificate in Use of ICT in the Classroom***

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