# Contents

CHAPTER 1: INTRODUCTION

1.1 Background of Study

In recent decades, the global education landscape has undergone a profound transformation with the widespread adoption of Information Communication Technology (ICT) in educational institutions. UNESCO defines ICT as a "diverse set of technological tools and resources used to transmit, store, create, share, or exchange information" (UNESCO, 2019). This definition encompasses a plethora of tools and platforms, ranging from computers and the internet to broadcasting technologies like radio and television, as well as telephony such as fixed or mobile phones, satellite communications, and video conferencing. The integration of ICT into education represents a paradigm shift, offering new opportunities to enhance teaching and learning methodologies.

The Republic of The Gambia, like many nations, has recognized the potential of ICT to revolutionize its educational landscape. The National Development Plan (NDP) of The Gambia underscores the government's commitment to improving the ICT infrastructure for citizens and businesses, recognizing the pivotal role of ICT in fostering equitable development across all sectors of the economy (GiEPA, 2024). This strategic vision aligns with global trends, highlighting priorities towards equipping students with the necessary competencies to thrive in the digital age.

The emergence of ICT-based learning methodologies, commonly referred to as electronic learning (e-learning), has reshaped educational practices worldwide. In The Gambia, tertiary and higher education institutions are increasingly embracing ICT tools and platforms to facilitate knowledge dissemination, collaborative learning, and academic research (The National Assembly of The Gambia, 2022). This transition signifies a broader commitment to harnessing technology to overcome barriers to education and prepare students for future professional endeavors.

Figure 1: Trends in ICT Usage in Africa: Mobile Connectivity and Internet Access
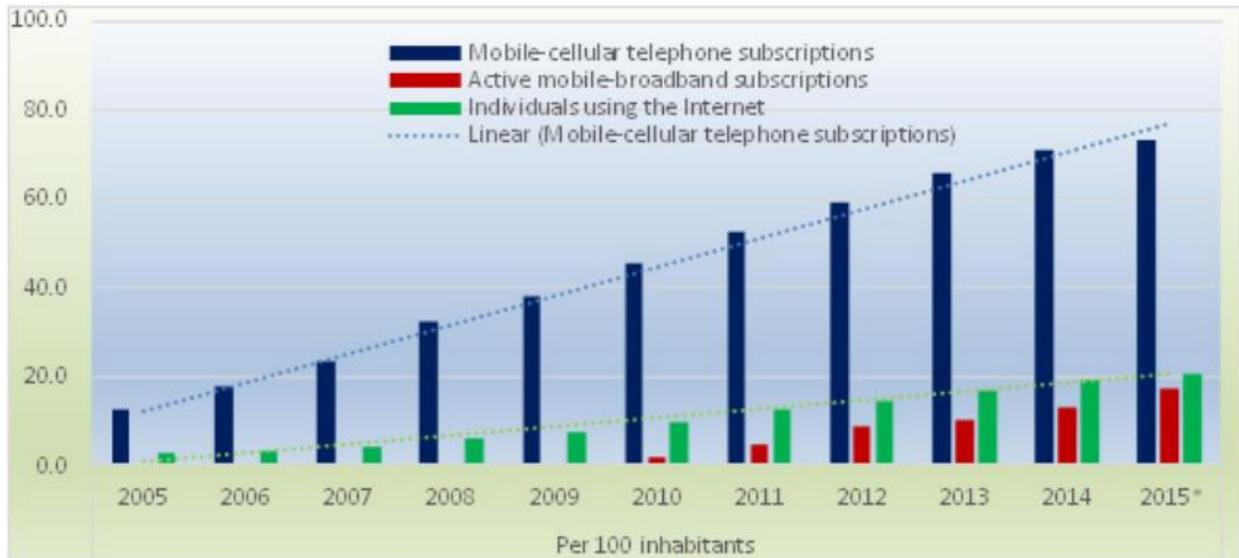
Source: International Telecommunication Union (ITU), 2017.

The figure above shows the observed trends in mobile cellular telephone subscriptions, active mobile-broadband subscriptions, and internet usage are indicative of the evolving landscape of information and communication technology (ICT) infrastructure in Africa. The exponential increase in mobile cellular telephone subscriptions, as depicted by the linear trend line, underscores the growing penetration of mobile communication technologies across the population. This proliferation of mobile devices not only signifies increased access to voice communication but also serves as a gateway towards broader digital connectivity and information access.

Concurrently, the steady rise in active mobile-broadband subscriptions reflects the expanding reach of high-speed internet connectivity, facilitating enhanced data transmission and access to online resources. Similarly, the upward trajectory of individuals using the internet signifies a growing user base engaging with online platforms and services. Together, these trends highlight the increasing reliance on ICT tools and platforms for communication, information dissemination, and access to educational resources, underscoring the relevance and importance of integrating ICT in tertiary education to meet the evolving needs of learners and educators in The Gambia.

1.1.1 Challenges and Opportunities:

However, the integration of ICT in Gambian tertiary education is not devoid of challenges. Infrastructure limitations, such as unreliable internet connectivity and inadequate power supply, pose significant hurdles to the seamless implementation of online learning initiatives. Moreover, resource constraints and technological disparities among institutions may impede equitable access to ICT-enabled educational resources. In addition to physical resources, there are gaps within institutions in getting the right and competent human resources to teach as well as manage ICT resources within educational institutions.

Despite these obstacles, there exist substantial opportunities for leveraging ICT to enhance teaching effectiveness, promote lifelong learning, and bridge educational divides within the Gambian context (Soma, Adusei, & Ibrahim, 2021).

The emergence of high-level courses in ICT within educational institutions is expected to create a pool of human resources that will help drove the ICT agenda of the country, prioritizing skills and competency development for the priority sectors of the economy.

1.1.2 Infrastructure Challenges:

Unreliable internet connectivity remains a pervasive issue in The Gambia, hindering the widespread adoption of online learning platforms and digital resources. Limited access to high-speed internet infrastructure in rural areas exacerbates disparities in educational opportunities, as students in urban centers often have better access to ICT facilities. Additionally, frequent power outages pose a formidable challenge to the sustainability of ICT-based learning initiatives. The erratic power supply undermines the reliability of online platforms and necessitates alternative measures, such as backup generators or solar-powered solutions, to ensure uninterrupted access to educational resources.

1.1.3 Resource Constraints

Resource constraints present another barrier to effective ICT integration in Gambian tertiary education. Many institutions grapple with limited funding for ICT infrastructure development and

capacity building initiatives. The cost of acquiring and maintaining ICT equipment, such as computers, tablets, and interactive whiteboards, poses a significant financial burden for universities with limited budgets. Moreover, the shortage of qualified ICT professionals and educators proficient in integrating technology into pedagogical practices further impedes progress in ICT-enabled learning environments.

1.1.4 Opportunities for ICT Integration:

Despite these challenges, there exist significant opportunities for leveraging ICT to enhance teaching and learning outcomes in Gambian tertiary education. The growing availability of open educational resources (OERs) and digital libraries offers a wealth of learning materials accessible to students and educators across diverse disciplines. Specifically, The Gambia has developed a National Open and Distance Learning (ODL) Policy and is in the process of establishing a National research and Education Network (NREN). E-learning platforms and virtual classrooms provide flexible learning environments conducive to collaborative engagement and interactive instruction. Moreover, emerging technologies such as mobile learning apps, virtual reality simulations, and artificial intelligence-driven tutoring systems hold promise for personalized learning experiences tailored to individual student needs.

1.2 Statement of Problem

Despite the growing recognition of Information Communication Technology (ICT) as a transformative tool in education, Gambian tertiary and higher education institutions continue to grapple with challenges hindering effective ICT integration. This section delineates the key issues and challenges that necessitate empirical inquiry and intervention to optimize ICT utilization and enhance educational outcomes in The Gambia.

Infrastructure Limitations:
One of the primary challenges facing Gambian tertiary and higher education institutions is inadequate ICT infrastructure, including unreliable internet connectivity, power outages, and limited access to ICT-enabled learning resources. The lack of robust infrastructure undermines the seamless implementation of online learning initiatives and hampers students' access to digital resources, thereby impeding the realization of the full potential of ICT in education and training.

Resource Constraints:

Resource constraints present another significant barrier to effective ICT integration in Gambian tertiary education. Many institutions grapple with limited funding for ICT infrastructure development, capacity-building initiatives, and software licensing, constraining their ability to invest in modern technology and provide equitable access to educational resources. Additionally, the shortage of qualified ICT professionals further exacerbates resource challenges and impedes progress in ICT-enabled learning environments.

Technological Disparities:

Technological disparities among institutions exacerbate inequalities in access to ICT-enabled educational resources and opportunities. While some universities boast state-of-the-art ICT facilities and robust e-learning platforms, others struggle with outdated infrastructure and inadequate support systems. This digital divide widens disparities in educational outcomes and exacerbates socioeconomic inequalities, hindering efforts to promote inclusive development and equitable access to quality education.

Pedagogical Challenges

Pedagogical challenges also emerge as a critical issue in the context of ICT integration in Gambian tertiary education. Educators may lack the necessary training and support to effectively integrate technology into their teaching practices, resulting in suboptimal utilization of ICT resources and limited engagement with digital learning tools. Moreover, traditional pedagogical approaches may hinder the adoption of innovative teaching methodologies that leverage ICT to enhance student learning experiences and promote critical thinking skills.

Stakeholder Perceptions and Experiences

The perceptions and experiences of students, educators, and administrators regarding the use of ICT in teaching and learning processes also warrant investigation. Variations in stakeholder attitudes, digital literacy levels, and access to ICT resources may impact the efficacy of ICT integration initiatives and influence educational outcomes. Understanding stakeholder perspectives is essential for designing user-centric approaches to ICT integration and fostering meaningful engagement with technology-enhanced learning environments.

1.3 Research Objectives:

Understanding the multifaceted impact of Information Communication Technology (ICT) integration in tertiary education is essential for advancing educational practices and fostering inclusive learning environments. This section delineates the specific objectives guiding our investigation into the implications of ICT adoption within Gambian tertiary and higher education institutions. Through a comprehensive analysis of ICT utilization, teaching methodologies, and stakeholder perceptions, this study aims to provide actionable insights for enhancing educational outcomes and informing policy discourse in The Gambia.

- **Assess the current state of ICT integration:** This objective entails evaluating the extent to which ICT is integrated into teaching and learning processes in Gambian tertiary institutions, including the availability of infrastructure, access to digital resources, and utilization of ICT-enabled learning platforms.

- **Examine the impact of ICT adoption on teaching effectiveness and learning outcomes:** This objective focuses on understanding how ICT adoption influences teaching effectiveness and student learning outcomes in Gambian tertiary education. The investigation will encompass factors such as student engagement, academic performance, and faculty pedagogical practices affected by ICT integration.

- **Identify opportunities and challenges associated with ICT integration:** This objective seeks to identify the opportunities and challenges inherent in ICT integration in Gambian tertiary education. It includes examining infrastructure limitations, resource constraints, and technological disparities among institutions to inform strategies for optimizing ICT utilization.

- **Explore perceptions and experiences of stakeholders:** This objective aims to explore the perceptions and experiences of students, educators, and administrators regarding the use of ICT in teaching and learning processes. It entails understanding attitudes towards e-learning platforms, digital resources, and online collaboration tools to inform user-centric approaches to ICT integration.

1.4 Research Question

This section outlines the key research questions guiding my inquiry into the impact of ICT adoption in Gambian tertiary institutions. By addressing these questions through empirical investigation and analysis, this study seeks to generate actionable insights for optimizing ICT utilization and enhancing educational outcomes in The Gambia.

1. What is the current state of ICT integration in tertiary and higher education institutions in The Gambia?
2. How does ICT adoption influence teaching effectiveness and learning outcomes in Gambian tertiary education?
3. What are the opportunities and challenges associated with ICT integration in Gambian tertiary education?
4. What are the perceptions and experiences of students, educators, and administrators regarding the use of ICT in teaching and learning processes in Gambian tertiary institutions?
5. What will be the institutional and policy recommendations to enhance and promote the effective utilization of ICT in tertiary and higher education institutions in The Gambia.

1.5 Significance of Study:

The investigation into the impact of Information Communication Technology (ICT) in tertiary and higher education institutions in The Gambia holds significant implications for various stakeholders, including educators, policymakers, students, and the broader society. This section highlights the significance of our study in addressing key educational challenges, fostering innovation, and promoting inclusive development in The Gambia.

I. **Enhancing Educational Practices:**

By examining the current state of ICT integration and its impact on teaching and learning outcomes, this study seeks to identify opportunities for enhancing educational practices in Gambian tertiary institutions. Insights derived from our research can inform the design and implementation of pedagogical strategies that leverage ICT to improve student engagement, academic performance, and overall learning experiences.

II. Informing Policy Discourse:

This study contributes to informed policy discourse by providing empirical evidence on the opportunities and challenges associated with ICT integration in Gambian tertiary education. Policymakers can utilize the findings to develop evidence-based strategies and initiatives aimed at optimizing ICT utilization, addressing infrastructure gaps, and promoting equitable access to educational resources.

III. Empowering Stakeholders

Stakeholder empowerment lies at the heart of my research endeavor. By exploring the perceptions and experiences of students, educators, and administrators regarding the use of ICT in teaching and learning processes, we aim to amplify stakeholder voices and foster participatory decision-making processes. Empowered stakeholders are better equipped to advocate for inclusive educational practices and drive positive change within their respective institutions.

IV. Fostering Innovation and Digital Literacy:

The study of ICT integration in Gambian tertiary education serves as a catalyst for innovation and digital literacy development. By identifying best practices and innovative approaches to ICT integration, this research inspires creativity and experimentation in educational technology adoption. Moreover, by promoting digital literacy skills among students and educators, we contribute to building a future-ready workforce capable of thriving in the digital economy.

V. Promoting Inclusive Development:

Ultimately, the study aligns with broader national development objectives by promoting inclusive development through equitable access to quality education. By leveraging ICT to overcome barriers to education, bridge digital divides, and empower marginalized communities, and contribute to fostering a more inclusive and sustainable society in The Gambia.

1.6 Thesis Organization:

The study is structured into six chapters, each serving a distinct purpose in advancing our understanding of the integration of Information and Communication Technology (ICT) in education.

Chapter One: Introduction

This chapter serves as the gateway to the study, providing an overview of the research context, problem statement, research objectives and questions, scope and limitations, and the significance of the study. Additionally, it outlines the design and structure of the study, setting the stage for the subsequent chapters.

Chapter Two: Literature Review

In this chapter, a comprehensive review of theoretical literature from various sources is presented to contextualize the study within the framework of previous research. This includes desk reviews and publications from academic journals. Special emphasis is placed on the integration of ICT in teaching and learning, with a focus on the pivotal role of teachers in this process. The chapter explores teachers' competencies in ICT, the use of ICT in technological and pedagogical contexts, and factors influencing education transformation and teachers' attitudes towards ICT integration.

Chapter Three: Methodology

The methodology chapter outlines the research methodologies employed in the study, including the background of the study, research design, selection of research instruments, sampling procedures, data collection methods, ethical considerations, and limitations of the study. It also considers the measures of instrument reliability and validity. This chapter provides a transparent account of the research process, ensuring the credibility and rigor of the study's findings.

Chapter Four: Data Analysis Technique

This chapter will center on the presentation, analysis, and interpretation of data collected from the questionnaires and interviews. The process will involve organizing the findings in alignment with the study objectives. The presentation of findings will be structured using tabular forms and charts to provide a visual representation of the data. Each table and chart will be accompanied by an analysis of the responses obtained from the administered questionnaires. Simple pie charts, bar graphs, and frequency distribution tables will be utilized to offer a pictorial representation of analysis.

Chapter Five: Summary, Discussion, and Recommendations

The final chapter of the thesis provides a comprehensive summary of the study's findings, followed by a discussion of the implications for theory, practice, and policy. It concludes with actionable recommendations for stakeholders in the education sector in The Gambia, based on the insights generated from the research.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, an attempt is made to review the different literature, i.e. theoretical, conceptual and empirical, that relates to ICT and Tertiary Education. Through this review, the chapter will also shed light on and explore the concepts and definitions of ICT, Tertiary Institution, and its evolution over time. Further attempts will be made in this chapter to review the works of other scholars on ICT and Tertiary education, thereby identifying the existing gaps in the literature. Based on the reviewed literature, a theoretical framework which will serve as a guide for data collection, analysis, and presentation of findings.

2.2 CONCEPTUAL REVIEW

2.2.1 Overview and Definition of ICT

Information Communication Technology (ICT) encompasses a broad range of technological tools and resources used to transmit, store, create, share, or exchange information (UNESCO, 2019). This includes various hardware equipment, such as computers, scanners, and digital cameras, as well as software applications like databases and multimedia programs. Additionally, telecommunication infrastructure, including phones, faxes, and videoconferencing equipment, facilitates communication and access to digital media on both local and international scales.

Figure 1 illustrates the various technologies, including devices and functions, that surround us and emit information signals. ICT stands for Information and Communication Technologies, which encompasses all technologies that can detect, interpret, and exchange information with others. ICT is a plural term that refers to a multitude of technologies. It is an all-encompassing term that includes electronic tools used to gather, record, store, exchange, and distribute information. In summary, ICT comprises the complete range of electronic tools and technologies that we use to interact with and exchange information with others.

Figure 1. ICT comprises many technologies for capturing, interpreting, storing and transmitting information
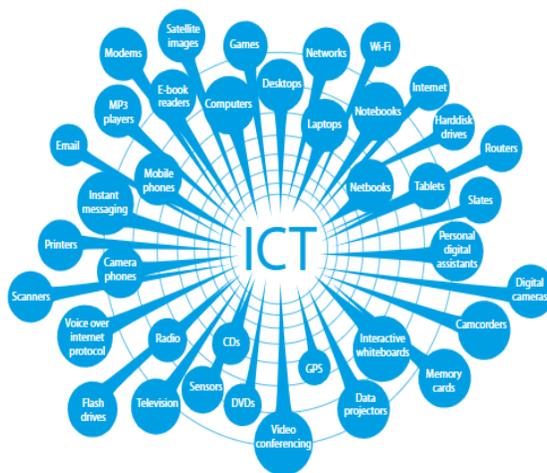
In educational contexts, ICT plays a transformative role in facilitating teaching and learning processes, enhancing access to educational resources, and fostering interactive learning environments. ICT-enabled learning methodologies, commonly referred to as e-learning, leverage electronic devices and digital platforms to deliver educational content and facilitate communication and collaboration among students and educators (Ally, 2004). The integration of ICT in education has the potential to increase educational efficiency, improve learning outcomes, and prepare students for participation in the digital economy.

Moreover, the evolution of ICT has led to the emergence of innovative teaching and learning approaches, such as blended learning and flipped classrooms, which combine traditional face-to-face instruction with online learning activities (Bates & Sangrà, 2011). These approaches offer flexibility and personalized learning experiences, allowing students to access educational content at their own pace and convenience. This creates widened range of flexibility for students to access and utilize learning resources at their convenience. Additionally, ICT facilitates the creation and dissemination of open educational resources (OER), which are freely accessible digital materials that can be used for teaching, learning, and research purposes (UNESCO, 2015). The widespread

availability of OER promotes inclusive and equitable access to educational resources, regardless of geographical location or socioeconomic status.

2.2.2 Overview and Definition of Tertiary and higher education institutions in The Gambia

Tertiary and higher education institutions in The Gambia refer to post-secondary educational institutions that offer advanced academic and vocational training beyond the secondary school level. These institutions play a pivotal role in the educational landscape of the country, providing opportunities for individuals to acquire specialized knowledge and skills essential for their professional and personal growth (Gambia Ministry of Higher Education Research Science and Technology, 2017).

The diversity of tertiary and higher education institutions in The Gambia reflects the multifaceted nature of higher education in the country. Universities, colleges, and vocational training centers constitute the primary components of the tertiary education sector, each catering to distinct educational needs and aspirations of students. Universities in The Gambia, such as the University of The Gambia, offer undergraduate and postgraduate degree programs across various disciplines, including humanities, social sciences, natural sciences, engineering, medicine, and business studies (University of The Gambia, 2018).

Colleges in The Gambia typically provide vocational and technical education and training (TVET) programs aimed at equipping students with practical skills and competencies for employment in specific industries or sectors. These colleges offer certificate and diploma courses in fields such as agriculture, tourism, hospitality, construction, and information technology, among others (National Training Authority, 2018).

Vocational training centers in The Gambia focus on delivering skill-based training programs tailored to the needs of industry and commerce. These centers offer short-term courses and apprenticeships in trades such as carpentry, plumbing, electrical installation, automotive mechanics, and garment making, enabling individuals to acquire employable skills and enter the workforce with confidence (Gambia Technical Training Institute, 2015).

Beyond academic and vocational training, tertiary and higher education institutions in The Gambia serve as hubs of intellectual inquiry, research, and innovation. Faculty members and researchers engage in cutting-edge research projects across various disciplines, contributing to the

advancement of knowledge and the development of solutions to societal challenges. Additionally, these institutions foster a culture of community engagement and social responsibility, collaborating with local communities, government agencies, and industry partners to address pressing issues and promote sustainable development (Gambia College, 2016).

2.3 THEORITICAL REVIEW

Technology and Institutions

The digital evolution has completely altered all aspect of day to day life in the twenty first century. The continuous power of the World Wide Web and World e-commerce is increasing as the number of people with internet has greatly increased (Siu and Mou, 2005). The competitive advantage linked with the adoption of ICT in service companies are of different kinds such as the creation of entry barriers, increase in productivity, and intensify revenue generation from services (Fitzsimmons et al, 1997). Nevertheless, technology advancement have brought platforms where institutions creates, develop and obtain services which will be recognize by clients as superior while gaining access to online websites for different services (Surjadjaja et al, 2003). Service quality is among the key factors in electronic commerce (Santos, 2003). It is described as dissimilarity between client's expectations from the service experience and the service received (Oliver, 1980). Service quality is the customer's general feelings of the relative minority or superiority and its service (Bitner et al…, 1990).

Furthermore, Parasuraman, Zeithaml and Berry (1988) in their empirical study while referencing the if clause, indicates that "if the expected quality of service and actual perceived performance is equal or near equal the customers can be satisfy while a negative discrepancy between perceptions and expectation or 'performance-gap' leads to customers dissatisfaction, and a positive discrepancy leads to a consumer delight" (Richard Selassie Bebli, 2012). The correlations with expectation, perceived service quality and customer satisfaction have been studied in various research (Zeithaml, et al, 1996).

Technology acceptance model (TAM)

This model measures customers' behaviors towards adopting change in technology. Fred Davis (1986), a member of the Computer and information system, graduate School of Business Administration at the University of Michigan, US is believed to be the key figure in founding the TAM. The TAM is regarded as a widely used conceptual model in describing and estimating the behavior in getting used to technology (Hsu et al, 2009). The model was developed purposely to explain the nature and factors that determine computer usage. (Alenka Brezavscek et al, 2016). TAM has been endorsed in a large range of technology and has greatly been classified as an important model in a quite large number of applications in the past decades (Alenka Brezavscek et al, 2016). The model describes technology adoption can only be successful based on good manners toward two measures:

1. Perceived usefulness
2. Perceived ease of use

1. Perceived usefulness

The model is measured by using five (5) different methods. These are; being fast, time-saving, effort saving, cost reduction, and total usefulness. Zarai (2014) cited from (Davis et al.., 1989) that perceived usefulness has a huge effect in measuring individual acceptance of information system. Zarai (2014) proposed the hypothesis that perceived usefulness has a significant impact on customers' intention to use internet banking services. This makes it a critical parameter for consideration in adopting ICT within educational workflows.

2. Perceived ease of use

Perceived ease of use is the stage at which the user's attitude towards the Information system defines the level of easiness to use the system (Nadim et al….2008). Customers' willingness to accept the internet banking service relies heavily on its ease of use (Zarai, 2014). The level in which individuals believe that using a particular system would be free of effort (Davis, 1989).

Performance expectation: The potentiality of technology system usefulness and enabling the work of users based on his/her expectations (Venkateh et al. 2003). Performance expectation can be refer as individuals trust in the level of performance's adjustment if they use the system (Mansour Naser Alraja et al, 2016). Similarly, Vekatesh et al…, (2003) posit that performance

expectations consist of perceived usefulness, outcome expectations, job-fit, relative advantage, and also extrinsic motivation.

Behavioral Intention: The expectations of the users aim to carry out plans and decisions with respect to the use of technology (Venkateh et al. 2003). Behavioral intension refers to an individual intention level to use the technology (Budu et al, 2018; Venkatesh et al, 2012). The level of relationship has an impact on experience and behavioral intention significantly (Tran, 2020). Behavioral intention helps management to know whether clients will continue of leave the company (Rita Ambarwati et al, 2020). The fact that elderly clients have more difficulties in reacting to recently develop and complex information, it affects the process of learning new technology (Halili & Sulaiman, 2019; Paul et al, 2015).

Enjoyment Generated in the Use of Technology

The advancement in technology has impacted the life of all individuals in either qualitatively or quantitatively in recent age. The fast growth of technology has grasp into the lives of people and has launched changes in the world economic and commercial atmosphere. "Enjoyment refers to the extent to which the activity of using technology is perceived to provide reinforcement in its own right, apart from any performance consequences that may be anticipated" (Weijters et al., 2005).

Langeard et al. (1981) convey that people obtain pleasure in playing with machines, hence creating a life for self-service technologies. David's et al. (1992) disclosed that people appraise more positively the pleasure gained in using such services. Dabholkar (1996) put forward clients are more likely to utilize a self- service technology when they believe it would be satisfying (Shamdasani et al., 2008).

In conclusion, Holbrook et al. (1984) revealed that enjoyment s attributes of computer software, also Holbrook and Hirschman (1982) indicated that the novelty feature motivate people to try new technologies (Richard Selassie Bebli, 2012) Igbaria and Livari (1995); Venkatesh and Davis (1996); Agarwal et al.., (2000) posit empirical evidence on the impact of computer self-efficacy on perceived usefulness and perceived ease of use

Performance expectation: The potentiality of technology system usefulness and enabling the work of users based on their expectations (Venkateh et al. 2003). Performance expectation can be refer as individuals trust in the level of performance's adjustment if they use the system (Mansour Naser Alraja et al, 2016). Vekatesh et al…, (2003) posit that performance expectations consist of perceived usefulness, outcome expectations, job-fit, relative advantage, and also extrinsic motivation. Linked to performance expectations are factors such as effort expectancy, social influence, and facilitating conditions. These are detailed below:

- **Effort Expectancy**: The user's expectations about the ease of use of technology (Venkateh et al. 2003,)
- **Social Influence**: The way in which an individual is influenced by others to commence or continue using the technology (Venkateh et al. 2003)
- **Facilitating Conditions**: The expectation level on how companies and technical infrastructure supports technology usage (Venkateh et al. 2003,)

2.3 EMPIRICAL REVIEW

Several empirical studies have investigated the impact of ICT adoption in tertiary education, providing valuable insights into the opportunities and challenges associated with integrating technology into teaching and learning practices.

Gikas and Grant (2013) conducted a longitudinal study to examine the effects of mobile technology integration on student engagement and achievement in higher education. Their findings revealed a positive correlation between mobile technology use and student engagement, with students reporting greater motivation, participation, and collaboration in learning activities facilitated by mobile devices.

Similarly, Al-Adwan and Al-Adwan (2012) conducted a survey-based study to assess the perceptions of university students towards the use of e-learning platforms in Jordan. The results indicated a high level of acceptance and satisfaction among students regarding the use of e-learning tools, highlighting the potential of ICT to enhance access to educational resources and support flexible learning environments.

In a study by Hew and Cheung (2014), the impact of ICT integration on teaching effectiveness and student learning outcomes in higher education was examined. Through a meta-analysis of existing research literature, the authors found a positive association between ICT use and student achievement, with technology-enhanced teaching methods yielding better learning outcomes compared to traditional instructional approaches.

Furthermore, research by Sang et al. (2010) explored the factors influencing the adoption and use of ICT among university lecturers in Nigeria. The study identified factors such as technological infrastructure, training and support, and pedagogical beliefs as significant determinants of ICT integration in teaching practices.

Overall, these empirical studies underscore the importance of ICT integration in tertiary education for enhancing student engagement, learning outcomes, and teaching effectiveness. However, they also highlight the need for comprehensive infrastructure, training, and support mechanisms to facilitate the successful implementation and utilization of ICT tools in educational settings.

CHAPTER 3: METHODOLOGY

This chapter of the research explained how the sample will be driven, the research approach, sample size, target population, data collection procedure, and the tools to be used in analyzing the data. The result of the sampling will be presented in both graphs and tables.

3.1 Research approach

The two main approaches in research are qualitative and quantitative. Quantitative research uses statistics and numbers that are presented in figures while the qualitative approach depends on narrating an event with the use of words. According to Yin (1994) choosing a research approach depends on the research question, each approach has its merits and demerits and how empirical data is collected and analyzed. A comparison of both approaches has been made and the quantitative research approach will be used for this study.

3.2 Sampling techniques and sample size

A convenience sampling method will be use and subjects to be select based on their convenient accessibility and proximity. Since it would be cumbersome to study this large population, only students who are available at various school will be targeted and due to a number of reasons

including, but not limited to, time constraint, costs and accessibility, the sample for the study is 221 students which was later increased to 261. This adjustment has been made because of expected sampling error and non-responses.

Stratified random sampling technique was used to select respondents from the entire population, thus ensuring all respondent were given an equal chance of being selected into the study sample. The sample for the study was determined by using the following formula:

$$n = \frac{N}{1+N(e)2} = \frac{496}{1+496(0.05)2} = 221$$

Where n is the optimum sample size, N = 496 is the population of all either University students or MDI students while e is the probability of error determined as the 0.05 for 95% confidence level. Using probability proportionate sampling (PPS), this sample was finally split into 157 from various schools of UTG, GTMI, GC, GTTI, and AIU/WA while 104 administrative from MDI. The PPS will used to calculate the total number of respondents to be selected from each school. Of the 133 respondents, 23 were selected from the School of Business and Public Administration (UTG), 48 from The Gambia College (GC), 23 from School of Information Communication and Technology (UTG), 10 from School of Agriculture and Environmental Sciences (UTG), 10 from School of Medicine and Allied Sciences (UTG), 16 from School of Education (UTG), 10 from School of Nursing (UTG), 6 from School of Public Health (UTG), the American International University West Africa and Legacy University (AIWA), 3 from The Gambia Telecommunication and Multimedia Institute (GTMI) and 2 from Gambia Technical Training Institutes.

3.4 Data collection method

A self-administered, structured questionnaire will be used to collect information from customers. After explaining the objective of the research, each respondent is to fill out a questionnaire and the questionnaires will be distributed in three different branches during work hours. Primary data is the information obtained from a first – hand source through which either surveys, experiments or observations are used. The obtained data from primary source was never been published and it's from a new research study collected from a source (Rajeev Shrestha, 2009).

In this study, primary data will be used to attain the research objectives and come up with an authentic conclusion. Primary data will be collected using questionnaires and semi structured interview questions. The conclusion of this research will base on the primary survey. The data collected will formulate set of questionnaires and the questionnaires will be filled by clients of the bank.

The whole findings of this research will base on data collected and the details provided by the sampled respondent. The study will use questionnaire and interview questions to help gather quality and reliable data.

3.4 Target population

Rajeev Shrestha (2009) posit population as the industries of similar nature of service and brands, he further explained population as a combination of objects in an operation. The Ministry of Higher Education, Research, Science and Technology (MoHERST), established in 2007, is responsible for tertiary and higher education (including Teacher Training) in the Gambia. The Directorate of Higher Education, one of the three directorates in the ministry, has oversight responsibility over the four major tertiary-level institutions in the country namely: The University of the Gambia (UTG), and four other post-secondary institutions: The Gambia College (GC), The Gambia Technical Training Institute (GTTI), The Management Development Institute (MDI), and The Gambia Telecommunication and Multimedia Institute (GTMI). The Gambia College offers three-year program for the pre-service and in-training of basic education teachers, as well as training courses in agriculture, livestock, public health, nursing, and midwifery. The majority of students are enrolled in the School of Education. The College has recently been made responsible for delivering in-service teacher training throughout the country through the regional training officers, and for curriculum related matters. The GTTI provides two-year craft, technician and business training program leading to certificates or diplomas in business studies, computer studies, engineering and construction. The MDI offer courses mainly in management and accounting. It attracts students mainly from the government's department, parastatals, organizations and NGOs, although there are private as well. The MDI in collaboration with Personal Management Office (PMO) also run management program for middle- and top-level managers in the Civil Service. The GTMI is primarily the training wing for the Gambia Telecommunications Company (GAMTEL) and its Program includes science and technology related areas (UNESCOIBE, 2011).

The University of the Gambia is the only public university in the country and its main responsibility is to develop the human capacity of the Gambia. It has about 2000 students' annual enrollment and about 500 graduating students for both undergraduate and postgraduate studies. Recently, there a few private universities establishing in the country, they are the American International University West Africa and Legacy University. The sample will be in stratified. The stratum will help to capture subgroups.

3.5 Research instruments

The main instruments to be used will be questionnaires and divided into three sections. The source of the data in this research will be data collected from questionnaire and the entire research will be based on this data. All questionnaires will be given to respondents who can read and explain to respondents in their respective local languages for better and clear understanding of the questions that will be asked. The respondents will be ask to answer questions without being bias and confirm to them that their responses will be confidential. In accordance with the questionnaires, three research hypotheses were put across and are explained in the first chapter of this research. The primary source of data will be questionnaires which will contain questions and scales in order to achieve intension of this research.

The questionnaires that will include several multiple option questions and a Likert scale question that has being heavily used to understand respondent's level of agreement, neutrality or disagreement among series of different statements.

3.6 Data analysis

The information that will be collected from the field through the administered quantitative questionnaire will be run in SPSS software version. The data will be analyzed using frequencies, and mean, and their reliability shall be calculated using SPSS and the content authenticity of the questionnaire is to be checked using existing literature. The data will be analyzed using statistical techniques of linear regression, multiple regression, variance, and descriptive analysis.

The qualitative data will be analyzed using thematic analysis in which similar views will be gathered in themes to infer conclusions and recommendation.

3.7 Reliability & Validity

Reliability is the consistency of a survey, test, observation or a similar measuring device (Rajeev Shrestha, 2009). The way in which research instruments measures the model is an indicator of consistency. The whole idea about reliability indicates outcome should be one – off and be repeated (Rajeev Shrestha, 2009). The Cronbach's alpha is a coefficient which shows items grouped are positively correlated to each other (Richard Selassie Bebli). A constant result of test is considered reliable. The Cronbach's alpha is calculated using the average inter correlation between items assessing the concepts. The reliability further explained that as researchers carried out the same experiment, under similar circumstance and obtains the same outcome. Also, the closer to one Cronbach's alpha is, the greater the internal steady reliability of a research instrument.

In order to ensure reliability of the instrument, the questionnaire will be verified by the researcher's supervisor with better understanding of scientific research methods. For purposes of clarity, the questionnaire will further be pilot tested and consequently fine-tuned. In order to ensure logical completeness and consistency of responses, data editing will be carried out each day by the researcher and identified mistakes and data gaps will be rectified as soon as possible.

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