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Socioeconomic Status, Perceived Institutional Support, and Attitudes toward Educational Technology Adoption among Undergraduate Teacher Trainees at a Public University in Uganda

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Declaration

I, **Alihaj Salim Guma** (Reg. No. **BU/GS22/MEP/3**), certify that this dissertation titled "Socioeconomic Status, Perceived Institutional Support, and Attitudes toward Educational Technology Adoption among Undergraduate Teacher Trainees at a Public University in Uganda" is my novel work and has never been submitted to any other higher learning institution for any award. Where the works of other scholars were used, they were appropriately acknowledged.

Signature ..... Date....28:10:2024.....

Alihaj Salim Guma

Approval

This dissertation titled "Socioeconomic Status, Perceived Institutional Support, and Attitudes toward Educational Technology Adoption among Undergraduate Teacher Trainees at Busitema University" was written by Alihaj Salim Guma (Reg. No. BU/GS22/MEP/3) under our guidance. We certify that the dissertation is in accordance with the standards set by Busitema University for a dissertation in partial fulfilment of the requirements for the award of a master's degree. It is submitted with our approval as the supervisors.

Signature ..... Date 28/10/2024

Associate Professor David Kani Olema

Supervisor

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Associate Professor Dennis Zami Atibuni

Supervisor

Dedication

I dedicate this research to all educators and students striving to integrate educational technology (EdTech) into their learning environments. May their efforts lead to enhanced learning experiences and greater academic success.

Acknowledgment

First and foremost, I express my heartfelt gratitude to THE ALMIGHTY ALLAH for His abundant mercies, guidance, and protection throughout my research journey. One of the other notable things to appreciate Allah for is the good health He granted me. Second, I appreciate my adorable parents Mr. Salim Sulaiman and Mrs. Sauda Salim for their prayers for my success during the course of this study.

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May God bless all the above abundantly

(Amen).

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List of Abbreviations or Acronyms

3D-printing	Three-Dimensional printing
ADB	Asian Development Bank
AECT	Association for Educational Communications and Technology
AGRIC II MAIN	Agriculture Double Main
AI	Artificial Intelligence
ANOVA	Analysis of Variance
APA	America Psychologists Association
BIO/CHEM	Biology and Chemistry
BIO/PE	Biology and Physical Education
CBC	Competency-Based Curriculum
CVI	content validity index
df	Degree of Freedom
DV	Dependent Variable
ECO/ICT	Economics and Mathematics
EdTech	Educational Technology
ELS	English and Literature studies
ENT/ICT	Entrepreneurship and Computer studies
GEM	Global Education Monitoring
GEO/ICT	Geography and Computer studies
Hi	Alternative Hypothesis
ICT	Information and Communication Technology
ISER	Initiative for Social and Economic Rights
IV	Independent Variable

LLCI	Lower limit confidence interval
LMS	Learning Management System
MAT/CHEM	Mathematics and Chemistry
MAT/ENT	Mathematics and Entrepreneurship
MAT/GEO	Mathematics and Geography
MAT/ICT	Mathematics and Computer studies
MATECO	Mathematics and Economics
Mean_EdT	Means of the UTTs' attitudes toward EdTech adoption entities
Mean_IS	Means of the Institutional support measuring entities
Mean_SES	Means of the UTTs' socioeconomic Status measuring entities
MoES	Ministry of Education and Sports
MoF	Ministry of Finance
MoICT	Ministry of Information and Communications Technology
MoICT&NG	Ministry of ICT and National Guidance
MOOCs	Massive open online courses
MV	Moderating Variable
MWU	Mann-Whitney U-test
n	Sample size
N	Target population size
NCHE	National Council for Higher Education
OECD	The Organization for Economic Co-operation and Development
O-Level	Ordinary Level, Lower secondary school level
p -value/sig.	significance level
PHY/MAT	Physics and Mathematics

r	Pearson correlation coefficient
R^2	coefficient of determination
RCDF	Rural Communications Development Fund
SDG4	Fourth Sustainable Development Goal
SDGs	Sustainable Development Goals
Se	standard error
SES	Socioeconomic Status
Sida	The Swedish International Development Cooperation Agency
SPSS	Statistical Package for the Social Sciences
STEM	Science, Technology, Engineering, and Math
TAM	Technology Acceptance Model
TEL	Technology-enhanced learning
UBOS	Uganda Bureau of Statistics
UCC	Uganda Communications Commission
ULCI	upper limit confidence interval
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UTAUT	The Unified Theory of Acceptance and Use of Technology
UTT	Undergraduate Teacher Trainees
UTTi	UTT identification or questionnaire identification e.g. UTT02, UTT10
Year I	Year one of the study/course
Year II	Year two of the study/course
Year III	Year three of the study/course

Abstract

This study examined how perceived institutional support moderates the relationship between Socioeconomic Status and attitudes toward Educational Technology adoption among Undergraduate Teacher Trainees. It also explored the specific challenges the students encounter and the strategies they employ to overcome these challenges at Busitema University. Grounded in the Unified Theory of Acceptance and Use of Technology and Technology Acceptance Model, the study adopted concurrent parallel mixed-methods design, incorporating cross-sectional survey and interpretative phenomenological analysis designs. Both quantitative and qualitative data were collected from a sample of 241 undergraduate teacher trainees using questionnaires and analyzed using SPSS, and Microsoft Word for descriptive, correlation, and multiple regression analyses, and thematic content analysis, respectively. Results indicated moderate levels across all variables. Regression analysis revealed a significant model ($F(3,237) = 26.39$, $R^2 = 0.25$, $p < .01$), showing that both socioeconomic status ($\beta = 0.47$, $t = 2.19$, $p = .03$) and institutional support ($\beta = 0.41$, $t = 2.26$, $p = .02$) significantly influence undergraduate teacher trainees' attitudes toward Educational Technology adoption, though the interaction between them was not statistically significant ($\beta = -0.07$, $t = -0.85$, $p = .40$). Qualitative findings corroborated the quantitative results, highlighting challenges such as network instability, unreliable electricity, high data costs, insufficient training, and equipment issues. Undergraduate teacher trainees employ strategies such as utilizing university Wi-Fi during off-peak hours, Virtual Private Networks, and peer support to mitigate the challenges. This study therefore recommends enhancing financial support, technological infrastructure, training, peer collaboration, self-education, and open communication with management to improve Educational Technology adoption.

Chapter One

Introduction

Overview of the Chapter

This chapter contains the introduction section of the study, which includes the background of the study, statement of the problem, the purpose of the study, specific objectives of the study, research questions, study significance, scope of the study, and conceptual framework of the study.

Background of the Study

The widespread use of digital tools and platforms in educational contexts in recent years has fueled debate over their transformative capacity to improve pedagogies, students' engagement, and learning outcomes (Saini, 2020). Carstens et al. (2021), Rourke (2010), and many other scholars have confirmed this trend by underlining the tremendous opportunities technology provides to enrich educational experiences. However, challenges persist in adopting this technology, limiting its seamless integration into educational contexts worldwide (Johnson et al., 2016). Khan et al. (2023) have identified socioeconomic disparities among students as one of the key drivers in carrying out any educational activities that involve the use of technology. Socioeconomic issues, such as varying access to technology and digital resources, often worsen educational inequalities, increasing the digital divide and altering students' learning chances and outcomes (Werfhorst et al., 2022). Ghavifekr and Rosdy (2015) have also discovered that institutional support in terms of providing professional development opportunities for educators, the establishment of robust infrastructural frameworks and policies, and adequate training for students heavily impact the efficacy of integrating technology into an innovative education system. In this Background section of Chapter One, conceptual, historical, theoretical, and contextual perspectives of this study are discussed.

Conceptual Perspective

In this section, conceptualization in terms of definitions and area of coverage of keywords such as socioeconomic status, institutional support, EdTech, EdTech adoption, and attitudes towards EdTech adoption are discussed. These conceptualizations were derived or adopted from other previous scholars or dictionaries as follows:

Socioeconomic Status (SES).

There is no exact definition of SES. However, many scholars have tried to define it based on their understanding. For example, House (2002) and Galobardes et al. (2006) define SES as a measure of the combination of economic and social status. Gottschalk and Weise (2023), Lallez (1986), Lynch et al. (2022), OECD (2016), and Wingeier-Rayo (2023) assert that SES encompasses a spectrum of factors, including economic resources, family background, access to technology, and cultural contexts, which significantly impact students' proficiency with and access to EdTech resources. However, in this study, the definition of UTTs' SES mainly focuses on the measure of UTTs' ability to buy their own EdTech tools, such as laptops, smartphones, and data bundles, and their family status, allowing them to participate in EdTech activities at Busitema University. Milheim (2002) and Paccoud et al. (2021) highlight the significant influence of SES on determining students' attitudes toward technology adoption and recognizing disparities in access and utilization among students from various socioeconomic backgrounds. This predicament often results in a digital divide, which refers to inequalities in technology use between socioeconomic groups (Aderogba et al., 2021; Afzal et al., 2023; Meinrath, 2013).

Perceived Institutional Support

Globally, empirical studies have shown the importance of institutional support in promoting technology integration in educational contexts (Buabeng-Andoh, 2012; Jhurree, 2005; Kumpikaitė et al., 2021)**.** According to Peter et al. (2019), the Republic of Rwanda (2016)**,** and Žuvić-Butorac & Nebić (2009)**,** institutional support encompasses policies,

infrastructure, and training initiatives provided by educational institutions such as universities to implement a given activity effectively. These initiatives play a crucial role in shaping attitudes toward the adoption and integration of EdTech within educational institutions (Buabeng-Andoh, 2012; Christen & Bower, 2023). In this study, perceived institutional support is defined by UTTs' perceptions of providing services such as EdTech training programs, provision of internet and technical support, and licensing eLearning resources by Busitema University in their EdTech adoption.

Educational Technology (EdTech)

Spector (2016) defines EdTech as an ethical study and application of techniques aimed at fostering learning and enhancing performance through the creation, utilization, and management of suitable technological methods and resources. Meanwhile, UNESCO (1974) describes EdTech as a structured approach to planning, executing, and assessing the entire educational process, with defined goals and utilizing human expertise and technological tools to enhance teaching effectiveness. Lallez (1986) refines the second definition by defining EdTech as the development, application, and assessment of technologies and processes targeted at improving the human learning process. This implies that EdTech includes not only the use of gadgets or machines in education but also all processes that aid human learning (Ferster, 2014). In another study, Davies and West (2014) define EdTech as a strategic integration and deployment of technological tools, resources, and techniques within educational environments to optimize learning, teaching, and academic management processes.

All the above definitions emphasize supporting innovative approaches that include a wide range of digital platforms, software, hardware, and online resources specifically geared to improve and personalize learning experiences (Davies & West, 2014; OECD, 2016; Garlinska et al., 2023). Thus, in this study, EdTech is defined as a mechanism for making education more effective, interactive, and accessible by leveraging technology to tailor instruction, promote student engagement, foster collaboration within students, enable student self-paced learning,

and provide data-driven insights for educators and learners alike (Bourdeaux, 2017). Bharathi et al. (2020), Zhao et al. (2020) and Rui et al. (2023) assert that EdTech solutions span a broad spectrum of tools and resources, such as online learning platforms, virtual classrooms, digital assessments, interactive multimedia content, and educational applications. Ultimately, EdTech aims to leverage the power of innovation and digital capabilities to improve academic outcomes, meet varied learning demands, and adapt to the changing context of modern education (OECD, 2016).

EdTech Adoption

This study defines EdTech adoption as the extent to which UTTs at Busitema University accept, integrate, and embrace EdTech in their learning (Ujeyo et al., 2022). The degree of adoption was determined by UTTs' general attitudes toward EdTech integration, which refers to the positive or negative feelings that UTTs hold towards the use of EdTech in their learning environments. These attitudes encompass a range of psychological and emotional responses, including perceptions of the usefulness and ease of use of EdTech tools (Davis, 1989), confidence in using these technologies, and overall satisfaction with their educational experiences mediated by technology (Edmunds et al., 2012).

One of the key indicators of EdTech adoption is the utilization of the University LMS (Balkaya & Akkucuk, 2021). Furqon et al. (2023) define LMS as a digital online platform that provides students with access to course materials, facilitates communication with lecturers, supports coursework completion, and tracks learning progress. At Busitema University, where this study was conducted, the LMS is one of many platforms for enhancing blended learning. The extent to which UTTs utilize the LMS platform reflects their EdTech adoption level in their learning (Balkaya & Akkucuk, 2021).

Attitudes toward EdTech Adoption.

According to Salhab (2024), another measure of UTTs' attitudes toward EdTech adoption is the use of Zoom lectures or other video conferencing tools for virtual lectures and

discussions. Positive attitudes toward EdTech in this regard are characterized by UTTs' willingness to engage with these tools (Štemberger & Konrad, 2021). This was assessed from UTTs' positive responses concerning frequent access to the LMS, active participation in Zoom lectures, positive feelings towards perceived usefulness and ease of use of EdTech tools, and their active participation in other online learning activities such as virtual synchronous discussions with colleagues remotely and regular use of video conferencing technology (Bailey et al., 2022; Iriani & Nugraheni, 2023). On the other hand, negative attitudes might stem from perceived difficulties, lack of confidence, or inadequate institutional support, leading to resistance or minimal use of EdTech (Teo, 2011). The manifestation of negative attitudes is seen in UTTs' reluctance to use video conferencing technology, low

participation in online sessions, and low engagement in virtual discussions, as indicated in their negative responses towards EdTech adoption. The majority of the responses determine the overall UTTs' attitudes toward EdTech adoption at Busitema University.

Historical Perspective

Over the past few decades, technology has dramatically changed various global development sectors, with education being a critical domain influenced by technological advances (McDiarmid & Zhao, 2023; Timotheou et al., 2023; World-Economic Forum, 2022). According to Kaplan and Haenlein (2015) and Reyneke (2024), early innovations in EdTech can be traced back to ancient civilizations. For example, the use of hieroglyphics in Ancient Egypt around 3400 BC and the abacus in 4800 BC were among the first tools to facilitate learning (Alexandrina, 2022). These early tools laid the foundation for future advancements in educational methods and technologies. However, according to the Asian Development Bank ([ADB], 2023), attitudes toward the adoption of technologies have historically been higher among the rich than the poor due to different EdTech resource accessibility levels.

In the mid-1400s, a significant shift in educational practices occurred during the Renaissance period with the invention of the printing press by Johannes Gutenberg in

Germany, revolutionizing the distribution of information and increasing access to learning materials across Europe (Fust, 2009). This period marked the beginning of more structured educational systems, leading to the establishment of correspondence schools in the late 19th century, such as Anna Eliot Ticknor's first correspondence school in 1873, which extended educational opportunities to remote areas (Caruth & Caruth, 2013). In the 20th century, rapid advancements in EdTech were seen with the introduction of audio-visual aids in the 1920s, the development of the first stored-program computer in 1948, and the rise of computer-assisted instruction in the 1960s and 1970s (Reyneke, 2024). The advent of the internet in the 1990s transformed EdTech by enabling the creation of online educational resources and e-learning platforms (Niaz et al., 2021).

Daniel (2020) asserts that in the late 20th century, the integration of EdTech in education was relatively nascent. Early adopters were primarily from higher socioeconomic backgrounds in developed countries, where access to computers and the Internet was more readily available. The Global Education Monitoring Report by UNESCO (2023) highlighted that students from higher SES backgrounds had more positive attitudes towards EdTech, as they were more likely to have access to technology at home and in schools with better resources since the 1990s.

Global Education Monitoring Report by UNESCO (2023) also shows that a tremendous increase in technological innovations such as MOOCs, LMS, and AI-powered educational tools happened in the 21st century, which increased online engagement, collaboration, and self-directed learning, significantly influencing students' attitudes toward EdTech adoption. This dynamic evolutionary process emphasizes the importance of continuous adaptation to technological breakthroughs, with the potential for additional revolutionary technologies to shape the future of education. Advancements such as brain implants and 3D printing have the potential to further revolutionize education by improving cognitive capacities and providing

personalized learning experiences tailored to individual needs (Liu et al., 2023; Olatunji et al., 2023).

According to Daniel (2020), the significant increase in the availability of EdTech in the first decade of the 21st century has been driven by global initiatives. Developed countries such as the United States, China, the United Kingdom, and various European nations invested heavily in integrating technology into classrooms, significantly influencing students' attitudes towards EdTech, with increasing acceptance and positive perceptions of EdTech as a valuable learning tool (Daniel, 2020). However, SES continues to play a critical role; students from lower SES backgrounds often have less access to these technologies, leading to disparities in attitudes toward adoption rates (Devlin & Mckay, 2017; Munir et al., 2023).

Daniel (2020) further notes that EdTech adoption in developing regions in the first decade of the 21st century lagged due to limited infrastructure and resources. To address this, countries began formulating and implementing policies and programs aimed at improving access to technology in education from the late 2000s to the early 2010s and continuing into 2023. For example, South Africa established its National ICT Policy in 2006, Kenya in 2016, and Tanzania in 2023.

However, EdTech adoption in Uganda has evolved differently compared to other countries or regions. During the early 2000s and mid-2010s, the Ugandan government initiated several programs to improve ICT infrastructure and integrate technology into education. Programs such as the Rural Communications Development Fund (RCDF) established in 2001, Uganda's initial National ICT Policy in 2003, the National ICT Policy Framework in 2014, and the ICT for Education Project were pivotal in promoting ICT in all sectors of the economy, including education, enhancing Uganda's competitiveness in the global market (Ministry of ICT and National Guidance, Uganda, 2003; Uganda Communications Commission [UCC], 2001; World Bank, 2011). Despite these efforts, students' adoption of EdTech remains low in Uganda (Ministry of Education and Sports (MoES), 2020), which could be due to the influence

of students' SES as Williams (2024) noted that access to technology has remained limited, particularly in rural areas, where SES significantly influences students' attitudes towards EdTech.

The COVID-19 pandemic outbreak in 2020 catalyzed a rapid and unprecedented shift to online learning globally, highlighting the crucial role of institutional support in shaping students' attitudes toward EdTech (Li, 2022; Qazi et al., 2020). According to the Global Education Monitoring Report by UNESCO (2023), institutions that provided robust support systems, including training for educators, access to digital tools, and technical support for students, saw more positive attitudes and higher adoption rates. For instance, a survey in America by Campus Technology (2021) revealed that approximately 73% of students preferred some courses to remain fully online post-pandemic, demonstrating a significant shift in attitudes facilitated by institutional support. Whereas, in regions or institutions where support was lacking, students faced significant challenges, including limited access to devices and internet connectivity, inadequate training, and insufficient technical support (Arumugam & Chandre, 2023; Linhalis & Silva, 2023; Rahiem, 2020; Tadesse & Muluye, 2020). These barriers negatively impacted their attitudes toward EdTech, emphasizing the importance of comprehensive institutional support in promoting positive attitudes and successful adoption (Girard et al., 2021; Subramaniam, 2023).

In the context of Ugandan universities, EdTech adoption has varied significantly across institutions. Makerere University, the oldest university in Uganda, has been in the lead in integrating technology into its curricula, with substantial investments in ICT infrastructure and digital resources, potentially utilizing ICT integration projects (Baryamureeba, 2004; Opati, 2013). Other universities, such as Kyambogo University and Mbarara University of Science and Technology, have also made strides in incorporating EdTech, albeit with varying degrees of success and challenges related to resource allocation and infrastructure (National Council for Higher Education [NCHE], 2022).

While at Busitema University, serious e-learning initiatives such as Zoom meeting lectures and LMS usage have only recently (in 2021) picked up during the COVID-19 pandemic lockdowns, as all modes of teaching were shifted online following guidelines by the Ministry of Health (Kaweesi et al., 2022). According to Kaweesi et al. (2022), the shift to e-learning enabled students to continue their education remotely, which was crucial during the lockdown periods, though attendance and participation were very low. This implies that the low rate of students' participation in e-learning at Busitema University has been persistent since then, signifying barriers to effective e-learning, such as limited access to EdTech resources and inadequate institutional support.

This historical background has greatly highlighted the need to carry out a study examining UTTs' SES and institutional support in influencing UTTs' attitudes toward EdTech adoption. History has shown that higher SES regions and families have benefitted from greater access to technology and resources, leading to more positive attitudes and higher adoption rates, and the reverse is true: lower SES areas face significant barriers such as limited access to devices and internet, resulting in more negative attitudes and lower adoption rates (Attewell, 2001; Warschauer & Matuchniak, 2010). Thus, it was imperative to examine the level of UTTs' SES, the institutional support they received, and how these influenced their attitudes toward EdTech adoption at Busitema University.

Theoretical Perspective.

This study has been grounded in two theories in psychology: The Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology Acceptance Model (TAM). Developed by Venkatesh et al. (2003), UTAUT explains users' intentions such as UTTs' intentions to use a given information system and subsequent usage behavior. The theory examines the acceptance of technology as determined by performance expectancy, effort expectancy, social influence, and facilitating conditions, making the theory highly relevant to this study (Ba et al., 2023; Bayaga & du Plessis, 2024). The theory's idea of examining the

facilitating conditions on technology adoption helped in determining the influence of UTTs' SES on UTTs' attitudes toward EdTech adoption at Busitema University. It also helped to explain the role of institutional support in moderating the relationship between UTTs' SES and their attitudes toward EdTech adoption.

UTAUT was supported by TAM, developed by Fred Davis in 1986, and revised in 1989, to further examine UTTs' attitudes toward EdTech adoption. According to TAM, technology acceptance is predicted by UTTs' behavioral intentions, determined by their perceptions of the usefulness and ease of use of EdTech (Davis, 1989; McCord, 2006; Peter, 2021; Weerasinghe & Hindagolla, 2017). Perceived usefulness refers to the trust that employing EdTech enhances performance or helps achieve its goals, while perceived ease of use pertains to the belief that using the technology will be effortless and straightforward (Davis, 1989). In TAM, Davis further asserts that EdTech acceptance involves a three-stage process: (a) external factors (such as system design features, socioeconomic factors, and institutional support), influencing (b) cognitive responses (perceived ease of use and perceived usefulness), which in turn shape (c) affective response, ultimately influencing usage behavior (Marikyan, and Papagiannidis, 2023). This closely aligns with UTAUT, emphasizing the influence of facilitating conditions in EdTech adoption. Given their interconnectivity, these theories have greatly helped in underpinning this study, to effectively examine how institutional support and SES influence UTTs' attitudes toward the adoption of EdTech among UTTs.

Contextual Perspective.

Employing innovative approaches of teaching and learning is critical in today's ever-changing world, given the need to attain global, continental, national, and local goals. Currently, the 193 UN Member States, including Uganda, are making efforts to meet the 17 Global Sustainable Development Goals (SDGs), including Quality Education (SDG4), by 2030 (Initiative for Social and Economic Rights [ISER], 2019). Besides that, African countries are

striving to have technologically skilled human resources by 2063 (Ndizera & Muzee, 2018; Gerlich, 2023). Furthermore, Uganda as one of Africa's countries, strives to transform its citizens from peasantry to modern society by 2040 (Muwanguzi et al., 2018; Wilson, 2018; Walter, 2021).

Consequently, EdTech is increasingly becoming an ideal because it provides innovative teaching and learning approaches that benefit not only education sector but the society as a whole (Daniel, 2020; Singh, 2023), while also aligning with the aforementioned global, continental, and national goals. Crossley and McNamara (2016), Gumbo (2020), Minea-Pic (2020), and ZingerDoron (2009), have also highlighted the importance of providing teachers with access to technological pedagogy training, by stating that technological training helps teachers to properly accept and employ technology innovations in their teaching practices. Having technologically skilled teachers is the world's demand priority now (Beteille & Evans, 2019). For instance, with the implementation of a Competency-Based Curriculum (CBC) in Uganda's lower secondary school level (O-Level) (Geofrey, 2021; Charles, 2023), and the ever-changing world (Zhang et al., 2023), teachers must be able to use digital technologies competently to meet the needs of the curriculum and the world.

However, the adoption of EdTech has encountered several challenges worldwide. According to Daniel (2020) and Adediran et al. (2023), disparities in EdTech adoption persist globally with Sub-Saharan African countries, including Uganda facing significant hurdles in ensuring equitable EdTech integration in higher educational institutions. Niyigena et al. (2020) and Kaahwa et al. (2022) highlight the persistence of the digital divide in Ugandan higher education institutions which reflects a significant discrepancy in technology usage among students from various socioeconomic backgrounds. Busitema University, as one of the public universities and a teacher training center in Uganda, encounters notable disparities among UTTs in EdTech adoption (Ujeyo et al., 2022).

Furthermore, National policies that aim at fostering technological integration in education have encountered implementation bottlenecks at the institutional levels (Johnson et al., 2016). These issues could be attributed to the low level of UTTs' SES, as a study by Bagonza et al. (2021) indicates that the majority of students, including UTTs in Ugandan universities come from low-income families, making it difficult for them to buy the EdTech tools. Du et al. (2004) and Daniel (2020), have identified students' SES as a significant predictor of technology access and use in education. Thus, examining this relationship between the UTTs' SES and EdTech adoption at Busitema University became crucial because it may help provide empirical evidence, consequently generating important insights for promoting equity and ensuring equal opportunities for all UTTs to benefit from technological advancements in education.

On the other hand, Alison et al. (2019) argue that the impediments of insufficient funding and outdated technological infrastructure in Ugandan universities have often undermined the successful implementation of technology-related policies, contributing to educational inequalities. Buabeng-Andoh (2012), Crossley and McNamara (2016), and Rachel (2022) have confirmed this by identifying institutional support as an integral factor, in shaping the learning environment and fostering the effective use of EdTech. Strong support, including adequate training, resources, and infrastructure, enhances the likelihood that UTTs will embrace and successfully integrate technology into their teaching and learning practices (Ghavifekr & Rosdy, 2015; John et al., 2006). On the contrary, a lack of sufficient institutional support can act as a barrier, hindering the adoption and implementation of EdTech initiatives (Adediran et al., 2023). Thus, understanding the level of support provided by Busitema University for UTTs in moderating the relationship between the UTTs' SES and EdTech adoption was equally essential for identifying potential challenges and opportunities to enhance the integration of EdTech into teacher training programs at Busitema University.

Statement of the Problem

Successful adoption of EdTech among university students worldwide necessitates several important antecedents, including a high level of students' SES and robust institutional support (Garaika, 2020; Ravichandran & Shanmugam, 2023). Recognizing these imperatives, the Ugandan government, like its counterparts worldwide, has tried to establish national policies and frameworks to guide EdTech integration in academic institutions including Universities (Ministry of Education and Sports [MoES], 2020; Ministry of Information and Communications Technology [MoICT], 2014). Busitema University, like other public universities in Uganda, has been allocated annual funds in the national budget to support EdTech integration (Ministry of Finance, 2022, 2023, 2024). Furthermore, as one of the necessary study requirements at the university level, acquiring a personal computer and other EdTech devices by the students is emphasized worldwide (Ravichandran & Shanmugam, 2023).

Despite these efforts, UTTs' general attitude towards EdTech adoption at Busitema University remains a great concern. There is persistently low UTTs' attendance in EdTech activities such as Zoom lectures, and LMS use (Ujeyo et al., 2022). Anecdotal evidence from my personal experiences as a teaching staff at the university indicates that less than 20 out of 150 UTTs fully complete a 3-hour Zoom meeting lecture, and less than 10% of the UTTs access the University LMS in a day. These issues have raised great concern about whether the UTTs have the required EdTech resources and institutional support to effectively adopt EdTech at the University. However, limited empirical studies have been conducted at Busitema University, particularly focusing on UTTs, to assess these factors.

It was from this background that this study was purposed to examine the level of UTTs' SES and the level of their attitudes towards EdTech adoption and examine the level of institutional support as a moderating factor between UTTs' SES and their attitude towards EdTech adoption, while also exploring the challenges UTTs encounter and strategies they

employ to overcome those challenges in adopting EdTech at Busitema University. Addressing these issues may not only help in creating knowledge in this particular area but also create awareness about the root causes of UTTs' low engagement in EdTech activities at the University. This could help to reduce the likelihood of experiencing further challenges by the lecturers in effectively engaging the ever-growing number of UTTs at the University, in the aforementioned EdTech activities, which could potentially impede the goals of producing technologically skilled teachers from Busitema University.

Purpose of the Study

This study aimed at examining the moderating effect of institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University, while also exploring the challenges they face and the strategies they employ to overcome them.

Specific Objectives

1) To examine the level of UTTs' attitudes toward EdTech Adoption across demographic characteristics among UTTs at Busitema University.
2) To determine the level of UTTs' SES across their demographic characteristics in attitudes formation towards EdTech adoption at Busitema University.
3) To assess the variations in UTTs' perceptions of the various institutional support they receive in EdTech integration at Busitema University.
4) To assess the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University.
5) To evaluate the moderation effect of Institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University.
6) To explore the specific challenges UTTs encounter in adopting EdTech at Busitema University.

7) To explore the specific strategies UTTs employ to overcome the challenges they encounter in adopting EdTech at Busitema University.

Research Questions

1. What is the overall UTTs' attitude level toward EdTech Adoption across demographic characteristics among UTTs at Busitema University?
2. What is the level of UTTs' SES regarding EdTech adoption at Busitema University across their various demographic characteristics?
3. What are the different perceptions of UTTs about the institutional support they receive in EdTech integration at Busitema University?
4. What is the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University?
5. Does Institutional support moderate the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University?
6. What specific challenges do UTTs encounter in adopting EdTech at Busitema University?
7. What specific strategies do UTTs employ to overcome the challenges they face in the integration of EdTech at Busitema University?

Alternative Hypothesis (*Hi*)

H_1: There is a statistically significant moderate level of UTTs' attitudes toward EdTech adoption across demographic characteristics among UTTs at Busitema University.

H_2: There is a statistically significant moderate level of UTTs' SES across their demographic characteristics in attitudes formation towards EdTech adoption at Busitema University.

H_3: There are statistically significant variations in UTTs' perceptions of the various institutional support they receive in EdTech integration at Busitema University.

H_4: There is a statistically significant positive correlation between UTTs' attitudes toward EdTech adoption at Busitema University.

H_5: There is a statistically significant moderation effect of Institutional support on the relationship between UTTs' SES and their EdTech adoption at Busitema University.

Significance of the Study

Not many studies have been carried out on examining the attitudes toward EdTech among UTTs at Busitema University. Therefore, this study may be significant in enriching scholars with new knowledge and methodologies required for similar studies.

The study may be significant to different stakeholders, including UTTs, Lecturers, university administrators, policymakers, and EdTech providers. By exploring UTTs' SES and its impact on access to and utilization of EdTech resources, this study may shed light on potential disparities and inform strategies for fostering inclusivity.

By assessing the level of institutional support as a moderating variable, the study may help to identify key facilitators and barriers to effective EdTech integration, providing insights essential for refining support structures for UTTs and other students at Busitema University.

By examining the specific challenges UTTs encounter in adopting EdTech and the specific strategies they employ to overcome these barriers, the study may provide a comprehensive understanding of the dynamics at play and offer practical insights into improving EdTech adoption.

Without this kind of study, there may be a lack of evidence-based practices, potentially impeding the university's ability to optimize EdTech adoption.

This study could also set the basis for future research on EdTech adoption and other related aspects of EdTech. It aims to fill the gaps that may exist in the current research, contributing to a more informed and equitable approach to EdTech within teacher training programs at Busitema University and beyond. Consequently, this study may empower Busitema University and other teacher training institutions in Uganda and beyond to actively contribute to global initiatives like the UN's Sustainable Development Goal 4, ensuring quality

education globally by 2030; Africa's aspirations of improving education by 2063; and Uganda's Vision 2040, fostering the development of a technologically advanced society in the country.

Scope of the Study

This section provides the depth of investigation (content), geographical location and target population, and time frame of the study as follows:

Content

The study focused on examining the differences in UTTs' SES and EdTech adoption across demographic characteristics, and the variations in provision of institutional support for UTTs at Busitema University. It also evaluated the moderation effect of Institutional support on the relationship between UTTs' SES on their attitudes toward EdTech adoption at Busitema University. The study further explored the specific challenges UTTs face and the specific strategies they employ in addressing those challenges in adopting EdTech at Busitema University. These specific areas of investigation were chosen because a great concern has been raised upon them, due to low engagement or participation in EdTech activities, and little contextual research has been done on them especially in Uganda, particularly at Busitema University.

Geographical Area

The study was conducted at Busitema University Faculty of Science and Education. Busitema University Faculty of Science and Education – Nagongera Campus is one of the seven Busitema University campuses, located one-kilometer East of Nagongera Town, Tororo district, about 17 kilometers from Tororo town along Tororo- Busolwe road. See Appendix E. Busitema University Faculty of Science and Education, was the most appropriate place to undertake this study mainly because: (a) it is the faculty that trains teachers (b) it is accessible and cost effective for me (researcher); (c) it is the place where I have identified the research gap or experienced the difficulties of engaging UTTs in EdTech as a teaching staff; (d) Busitema University is one of the public universities in Uganda whose activities like EdTech

integration are fiscally planned in the annual national budget; and (e) Busitema University is a developing teacher training center, which advocates for EdTech integration by migrating its courses from offline to online through the development of LMS. Thus, offering a good avenue for this kind of research.

Time Scope

The study took me (the researcher) one (1) month to collect, analyze, and interpret the data. This was possible because a cross-sectional survey design was employed to collect data from diverse demographics in a short time. The study considered the UTTs (Year 1 to Year 3) for the academic year 2023/2024 as the target population. However, the researcher's direct interaction with the respondents that led to the identification of the research problem started since 2022, when year three UTTs were in year one. Thus, the time scope of the study was from 2021 to 2024.

Conceptual Framework

The following framework summarizes the conceptualization of the variables of the study, while also explaining their interactions. It contains both quantitative and qualitative interactions. Quantitative frames are shown by the full lines or boxes while dotted lines or circles illustrate the purely qualitative part of the study.

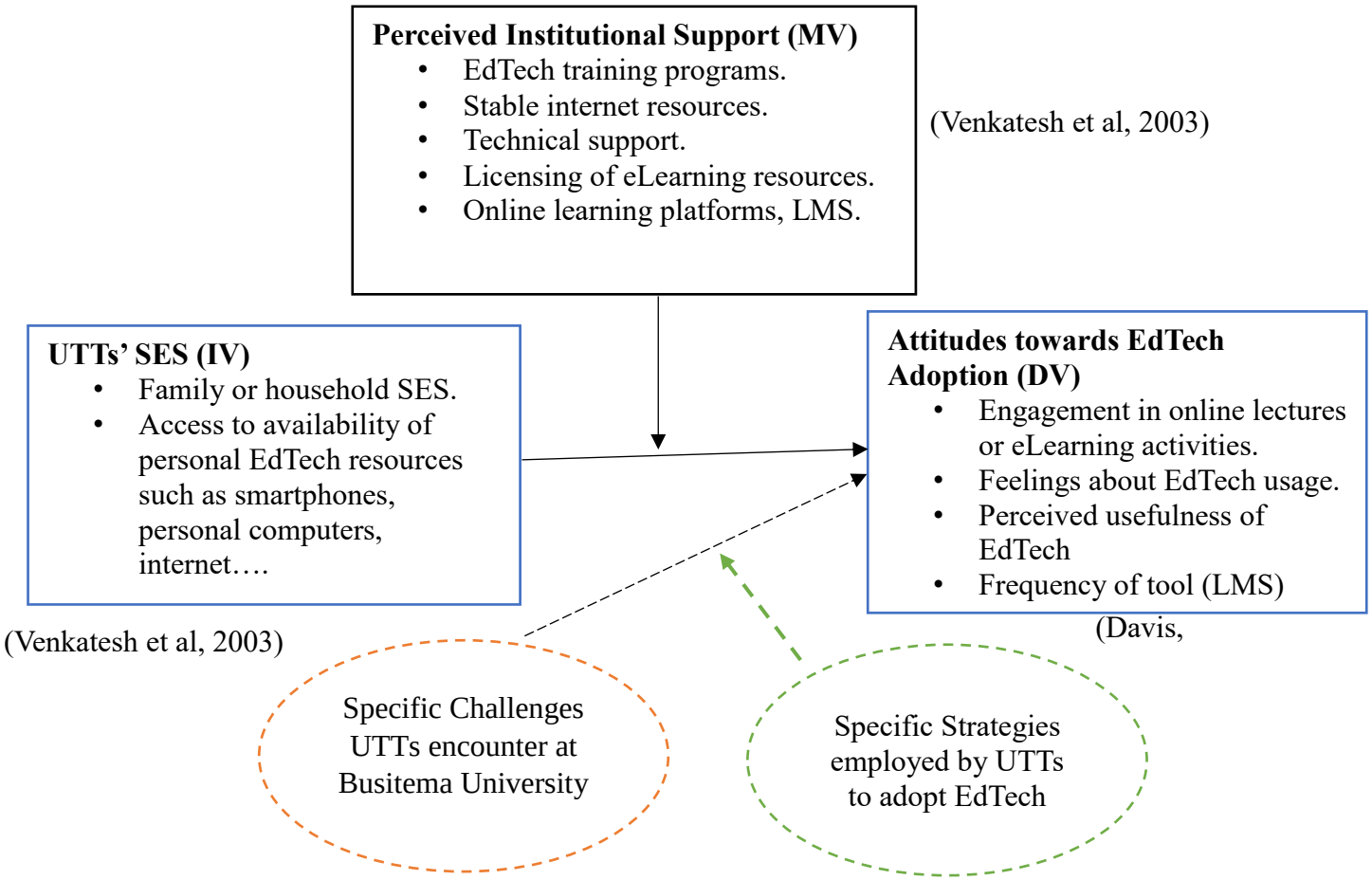

Figure 1: Conceptual Framework of the Study.

Source: Adapted from Memon, M. A., Cheah, J. H., Ramayah, T., Ting, H., Chuah, F., & Cham, T. H. (2019). Moderation analysis: Issues and guidelines. *Journal of Applied Structural Equation Modeling*, *3*(1), i–xi. https://doi.org/10.47263/jasem.3(1)01 (https://www.researchgate.net/figure/Conceptual-Framework_fig1_331175332)

Grounded in UTAUT and TAM theories, the above moderation effect conceptual framework of this study was adapted from Memon et al. (2019) to include the specific challenges encountered and specific challenges they employ to overcome the challenges at Busitema University. The framework gives a brief and visible insight on the interaction of the variables as shown by the arrows, following the specific objectives (see 1.4). In the framework, demographic characteristics of UTTs were not included because they are not considered major variables although assumed to have a direct influence on UTTs' attitudes toward EdTech adoption (DV), and their SES (IV). To some extent, it was predicted that UTTs' SES (conceptualized by UTTs' family or household SES and UTTs' accessibility of personal

EdTech tools and resources such as personal computers, smartphones, and reliable personal internet connectivity) reversely influences some of the entities of demographics such as choice of Subject combination. The framework shows that given the EdTech integration demands, there is a significant relationship between UTTs' SES and their attitudes toward EdTech adoption in terms of UTTs' engagement or participation in online platforms like LMS and Zoom lectures, UTTs' feelings regarding EdTech tools usage, and their perceived usefulness of EdTech resources usage (Amer et al., 2013). The framework agrees with the notion that the successful adoption of EdTech in Universities requires students to have a high level of SES if they are to adequately access the necessary EdTech resources (Christen & Bower, 2023; Selwyn, 2023). This is further confirmed by Devlin and Mckay (2017) and Lyons (2015) who note in their studies that students from high SES families tend to quickly adopt EdTech because they are able to access the necessary resources, and the reverse is true.

It was also believed in the framework that Institutional Support significantly moderates the relationship between UTTs' SES and their EdTech adoption. Institutional support encompassed the provision of EdTech training programs, provision of internet resources and technical support, and licensing of eLearning resources. The magnitude of the institutional support was believed to influence both UTTs' SES and EdTech adoption. The higher the institutional support, the higher the UTTs' SES and EdTech adoption among UTTs with diverse SES (Alone, 2017; World Economic Forum, 2015). However, unavoidable circumstances happen often in EdTech adoption leading to challenges (Johnson et al., 2016), thus investigation of specific challenges UTTs encounter in EdTech integration at Busitema University has also been incorporated in the framework. As humans, UTTs must have employed some specific strategies to overcome the challenges they encounter in adopting EdTech at Busitema University, thus the specific strategies UTTs employ in overcoming challenges they encounter in adopting EdTech at Busitema University were included in the above framework.

Chapter Two

Literature Review

Overview of the Chapter

In this chapter, I have comprehensively reviewed the related literature on the relationship between UTTs' SES and their attitudes toward EdTech adoption, how Institutional Support moderates the UTTs' SES and attitudes towards EdTech adoption, challenges students face and strategies they employ to overcome the challenges they encounter in adopting EdTech. The chapter begins with the theoretical review, then goes on to review the conceptual perspectives of the study, which is closely followed by the empirical review of the study objectives, and lastly identifies critical literature gaps.

Theoretical Review

This section of the literature review contains a broader discussion of the different theories, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM), which have been used by scholars to investigate factors that influence EdTech adoption among students.

The Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT was developed by Venkatesh et al. (2003) to explain how individuals accept and use technology (Momani, 2020). According to Ba et al. (2023) and Nillos (2023), the model proposes four core determinants of intention and usage: (a) performance expectancy, (b) effort expectancy, (c) social influence, and (d) facilitating conditions. Performance expectancy refers to the degree to which an individual believes that using technology will help attain gains in work performance (Venkatesh et al., 2003). This implies that students are more likely to adopt EdTech if they perceive that EdTech will enhance their learning outcomes and teaching effectiveness (Al-Emran et al., 2018).

Another determinant of intention and usage of EdTech is effort expectancy, which Venkatesh et al (2003) describe as the perceived ease and simplicity with which users can

learn, interact with, and utilize digital tools and platforms in their teaching or learning processes. It reflects the level of effort required to effectively use EdTech systems, influencing their intention to adopt and continue using these technologies. For UTTs, the ease of using EdTech significantly influences their willingness to adopt it (Nguyen et al., 2022; Teo, 2011). If the technology, such as the University LMS, is perceived as user-friendly and does not require extensive technical knowledge, students are more likely to embrace it (Alyoussef, 2023), thus shaping positive attitudes towards EdTech, and the reverse is true.

Next is social influence, which is the degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al., 2003). The opinions and behaviors of peers, instructors, and institutional leaders play a significant role in shaping students' attitudes toward EdTech (Razzak et al., 2024; Venkatesh & Bala, 2008). According to Marikyan and Papagiannidis (2023), when influential figures such as UTT leaders advocate for the use of technology and demonstrate its benefits, UTTs are more likely to follow suit.

The last determinant is the facilitating conditions, which are the most important in the context of this study. These refer to the extent to which an individual believes that organizational and technical infrastructures exist to support the use of the system (Momani, 2020). According to the UTAUT, the availability of technical support, training, and resources is critical in determining students' attitudes toward EdTech. Institutions that provide robust infrastructure and support mechanisms enable students to effectively integrate technology into their learning processes (Zhao & Frank, 2003). For example, providing reliable internet access and technical support can significantly enhance UTTs' adoption of EdTech (Bennett & Maton, 2010).

The UTAUT suggests that users have different technology adoption resources necessary when dealing with technology usage (Bayaga & du Plessis, 2024). Technology usage challenges vary from user to user and are perceived differently. The nature and outcome of

technology adoption depend on whether the available adoption resources are adequate to meet the challenges as perceived by the user (Ejiaku, 2014). Satisfaction and stability in technology adoption result from an individual's ability to recover from challenges, which includes adjustments to existing challenges, such as disorganization, recovery, and reorganization (Venkatesh et al., 2003).

Several studies have employed UTAUT in investigating or predicting the adoption of LMS and other EdTech tools and explaining their effectiveness. For example, Abbad (2021) employed UTAUT to understand students' usage of e-learning systems in developing countries and demonstrated that UTAUT effectively explained students' e-learning resources such as virtual classrooms, digital assessment tools, and online collaborative platforms. In another study, Jameel et al. (2022) revealed that UTAUT factors significantly influenced academic staff's intention to use LMS for emergency remote teaching. These studies have highlighted the importance of facilitating conditions and social influence in promoting technology acceptance among educators and students. The findings provide relevant insight to this study, where institutional support and SES were believed to have crucial roles in determining UTTs' attitudes toward EdTech adoption at Busitema University.

Technology Acceptance Model (TAM)

TAM, developed by Davis (1989), is another widely used framework for understanding technology adoption. TAM posits that perceived usefulness and perceived ease of use are the primary factors influencing an individual's decision to accept and use technology (Bradley, 2009; Enu-Kwesi & Opoku, 2020; Kelly & Palaniappan, 2023; Marikyan & Papagiannidis, 2023). According to Davis (1989), Henderson and Divett (2003), and Marikyan and Papagiannidis (2023), perceived usefulness is the degree to which a person believes that using a particular system would enhance their work performance, while perceived ease of use refers to the extent to which a person believes that using a particular system would be less effort.

In TAM, Davis also believed that external variables (such as system characteristics, user training, and support) influence perceived usefulness and perceived ease of use, which in turn affect the user's attitude toward using the system (Henderson & Divett, 2003; Madigan et al., 2017). This attitude then influences the user's behavioral intention to use a system, which ultimately determines actual system use (Davis, 2010).

According to Doo (2023), Nadri et al. (2018), Venkatesh and Bala (2008) and Wibowo (2019), Venkatesh and Davis (2000) further extended TAM by adding more factors, such as social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (such as job relevance, output quality, result demonstrability, and perceived ease of use), demonstrating the comprehensiveness of TAM in grounding studies about technology adoption.

Studies such as the ones conducted by Hong et al. (2021) and Zawacki-Richter and Jung (2022) have confirmed TAM's robustness in predicting EdTech adoption. Hong et al. (2021) used TAM to examine preschool teachers' technology adoption during COVID-19 and found that both perceived usefulness and perceived ease of use were directly significant predictors of behavioral intention toward EdTech adoption of preschool teachers. Zawacki-Richter and Jung (2022) emphasized the simplicity and robustness of TAM in understanding technology acceptance in various educational contexts, reinforcing its utility in predicting technology adoption behaviors. These closely align with this study, where UTTs' SES and institutional support were predicted to have a significant influence on UTTs' attitudes toward EdTech at Busitema University.

However, some studies, such as those by Bagozzi (2007) on the *Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift*, criticized TAM, arguing that the model oversimplifies the complexities of technology adoption by focusing primarily on perceived usefulness and ease of use without considering other potentially influential factors such as individual differences, situational constraints, and social dynamics. In the review of

TAM, Taherdoost (2022) also expressed concerns about TAM, saying that its predictive power might be limited in certain contexts, particularly when users face significant organizational or environmental barriers to technology adoption. These criticisms highlight the importance of considering additional variables such as institutional support and SES, which are central to this study, thus employing the two theories (UTAUT and TAM) to ground the study.

While UTAUT emphasizes a broader range of determinants, including social influence and facilitating conditions (such as UTTs' SES and institutional support), TAM focuses on the core constructs of UTTs' attitudes toward EdTech adoption. The integration of these theories offers valuable insights into EdTech adoption behaviors in educational settings, particularly when considering the unique challenges posed by SES and institutional support among UTTs at Busitema University (Davis, 1989; Venkatesh et al., 2003).

Review of the Key Concepts

In this section, a conceptual review of the objectives of this study has been carried out. The section provides rich content on the key components that shape the adoption of EdTech among UTTs. This includes the definitions and scope of various keywords and the significant influences of the key concepts of this study.

UTTs' Socioeconomic Status (SES)

According to APA (2024), SES includes more than just income, extending to factors like educational level, job prestige, and individuals such as UTTs' perceived social status and class. It represents the quality of life and opportunities available to individuals in society and consistently serves as a predictor for a wide range of psychological outcomes. (APA, 2024; Navarro-Carrillo et al., 2020).

Worthy et al. (2020) assert that SES represents the resources available to individuals, including family income, household wealth, parental education, and occupation. It impacts nearly every facet of well-being from before birth and continues throughout life. SES influences development through various channels – biological, social, and material and

interacts with genetically influenced traits. Additionally, socioeconomic conditions at the neighborhood and societal levels shape developmental outcomes (Worthy et al., 2020).

According to the National Cancer Institute (NCI) Dictionary, SES is a classification system that categorizes individuals based on their education, income, and occupation. It is typically divided into low, middle, and high levels. Those with lower SES often have more limited access to financial, educational, social, and healthcare resources compared to individuals with higher SES (National Cancer Institute, n.d.).

Navarro-Carrillo et al. (2020) also define SES as a multifaceted concept that includes both measurable factors, such as income and education, as well as individuals' subjective perceptions of where they stand within the socioeconomic hierarchy.

This implies that SES consists of various factors such as parental income, educational background, and access to resources, all of which play a crucial role in shaping students' proficiency with and utilization of EdTech tools and platforms, which this study was aligned with (Vadivel et al., 2023).

Perceived Institutional Support

According to Matviienko (2023), perceived Institutional support refers to perceptions of individuals such as students about the assistance, structures, and resources offered by formal and informal institutions to help individuals carry out their activities and improve their results. Wong et al. (2015) conceptualize institutional support as the policies, resources, and cultural frameworks that institutions provide to promote effective technology-enhanced learning (TEL). They argue that this support includes not only the provision of physical and digital resources (such as hardware and software) but also the creation of an organizational culture that encourages the use of educational technology through training and professional development (Wong et al., 2015).

In the Unified Theory of Acceptance and Use of Technology (UTAUT), Venkatesh et al. (2003) conceptualize facilitating conditions such as institutional support as the extent to

which individuals believe that organizational and technical infrastructure exists to support the use of technology. This includes access to necessary resources, training, and ongoing technical support. In your research, this would relate to teacher trainees' perceptions of how well the university supports them in adopting educational technologies.

Educational Technology (EdTech)

Gedik (2020) asserts that EdTech is often confused with learning technology or instructional technology. According to him, instructional technology is a subset of EdTech. Instructional technology is specifically focused on the instructional aspects of education, emphasizing restructured instructional system components and controlled learning environments (Bourdeaux, 2017). Then, Chugh et al. (2023), Crossley and McNamara (2016), and Gedik (2020) define EdTech as the strategic integration and application of technological tools, resources, and methodologies within educational settings to optimize the processes of learning, teaching, and academic management. This detailed insight involves a complicated, and integrated process that evaluates and resolves challenges in human learning, ranging across various dimensions. Within EdTech, solutions to challenges are manifested in the form of learning resources, such as messages, people, materials, devices, techniques, and settings, which are carefully designed, selected, and utilized to facilitate learning experiences (Dag, 2004; Issing & Schaumburg, 2001; Kovalevskaitė & Vaičenonienė, 2015; Laleye, 2015; Mayes et al., 2015).

As a field and profession, the Association for Educational Communications and Technology ([AECT], 1977) asserts that EdTech embodies a concerted effort to apply theoretical frameworks, intellectual techniques, and practical applications to enhance educational processes.

It is also essential to differentiate EdTech from "technology in education," which pertains to the application of technology to various operational processes within educational institutions, distinct from the approach of EdTech (Bourdeaux, 2017). According to the World

Bank (2021), EdTech is the strategic integration of digital platforms, software, hardware, and online resources. It endeavors to foster more effective, interactive, and personalized forms of education, catering to the diverse needs of educators and learners alike.

EdTech Adoption

In psychological terms, EdTech adoption among UTTs is defined as the cognitive, affective, and behavioral processes that enable UTTs to conceptually accept, integrate, and use EdTech tools and resources as part of their teacher training (Office of Educational Technology, 2024). Cognitively, it involves understanding the relevance, functionality, and potential benefits of incorporating technology into future teaching practices. In the affective domain, it includes developing positive attitudes, beliefs, and perceptions about using technology for educational objectives (Hartman et al., 2019). Behaviorally, it entails actively using EdTech tools and incorporating them into lesson planning, instruction delivery, and classroom management (Crossley & McNamara, 2016). Holden and Rada (2011), and Sharma and Srivastava (2020) note that EdTech adoption among UTTs is significantly influenced by psychological characteristics such as self-efficacy, motivation, perceived ease of use, and social effects.

Bond and Bedenlier (2019) also define EdTech adoption as the extent to which educational institutions incorporate and utilize technological advancements within their specific educational environments. According to Haleem et al. (2022) and Poshu (2023), the significance of EdTech adoption lies in its transformative capacity to revolutionize teaching and learning experiences. EdTech empowers educators to integrate novel technologies and tools into their classrooms, enhancing instructional methodologies (Bourdeaux, 2017). By leveraging digital tools and resources, Das et al. (2023) note that EdTech fosters student engagement, and personalized instruction, and broadens access to education. It serves as a cornerstone in delivering dynamic, interactive, and tailored learning opportunities to students, transcending traditional educational paradigms (Alam & Mohanty, 2023; Song et al., 2024).

This underscores the transformative potential of EdTech in enhancing educational experiences, which implies that academic institutions must prioritize EdTech integration to create engaging, personalized, and accessible learning environments (Diagnostico & Negocio, 2023).

In another study, Daniel (2020) states that EdTech adoption extends beyond merely incorporating technology; it encompasses embracing innovative approaches that harness digital capabilities to optimize educational outcomes. Through the utilization of EdTech, learners gain access to diverse online programs, allowing them to explore topics relevant to their academic or professional interests and expand their knowledge base (Bourdeaux, 2017). These programs not only enhance cognitive skills but also contribute to improved academic performance and overall well-being (Bourdeaux, 2017; Finn et al., 2014; Miller, 2011). According to Phel et al. (2023) and Sweeney (1995), embracing EdTech enhances learning experiences and equips students with essential skills and competencies required for success in today's technologically driven world. This indicates that beyond the practical benefits of EdTech, its adoption prepares students for the demands of the modern workforce, making it a crucial component of contemporary education.

Attitudes toward EdTech Adoption

The concept of attitudes toward EdTech adoption encompasses both positive and negative perceptions, beliefs, and feelings that students hold about using technology in education (Johnson et al., 2016; Songkram et al., 2023; Wijnen et al., 2023). Positive attitudes are crucial for successful integration, as they lead to higher motivation and more effective use of EdTech tools. Several studies have explored attitudes toward EdTech adoption, including the one by Teo et al. (2015), who investigated the determinants of pre-service teachers' attitudes toward computer use and found that perceived usefulness and perceived ease of use were significant predictors of positive attitudes. In 2006, Albirini also examined teachers' attitudes toward ICTs in Syrian schools and highlighted that positive attitudes were strongly linked to teachers' familiarity and comfort with technology. In another study, Sang et al. (2010)

further reveal that teachers' attitudes toward technology are influenced by their beliefs about the relevance and benefits of technology for teaching and learning. These studies demonstrated that increasing teachers' and students' familiarity with technology and its practical benefits can enhance their willingness to adopt EdTech (Johnson et al., 2016).

Empirical Review of the Objectives

This section contains the review of the specific objectives of the study. It encompasses the related literature for each and every specific objective of this study as discussed below:

The Level of UTTs' Attitudes toward EdTech Adoption across Demographic Characteristics among UTTs at Busitema University

Several studies including by Asian Development Bank (2023), Buabeng-Andoh (2012), Hathella and Priyanath (2021), Hernández et al. (2011), and Sánchez & Hueros (2010) also highlight the important role of demographic characteristics such as age, gender, sex and prior experience play in shaping students' attitudes toward EdTech adoption. In their studies, Sánchez and Hueros (2010) and Hernández et al. (2011) note that younger students and males generally exhibit more positive attitudes towards EdTech compared to their older and female counterparts. In other studies, Irani (2000) and Vaportzis et al. (2017) reveal that prior experience with technology is an integral factor, in enhancing positive attitudes, as familiarity and ease of use reduce apprehension and resistance to adoption. Li and Ranieri (2013) confirm these findings, noting that younger students indeed tend to have more positive attitudes toward EdTech adoption due to their familiarity and comfort with digital technologies. This implies that tailored strategies considering demographic differences are essential for addressing diverse attitudes and fostering inclusive EdTech adoption.

According to Joel (2015) and Ravichandran and Shanmugam (2023), EdTech has been highly adopted by higher education institutions in recent years worldwide. Adediran et al. (2023) confirm this and assert that every university is currently working harder to digitalize its courses. The burgeoning EdTech industry is estimated at nearly $90 billion in 2020 and is

projected to experience a robust annual growth rate of 20% until 2028 (Noshin, 2020). This underscores the increasing investment and importance placed on leveraging technology to enrich educational practices and outcomes.

However, challenges persist in this widespread adoption of EdTech in Trans-Saharan African countries such as Uganda (Adediran et al., 2023). These challenges are associated with various factors, with SES and institutional support being prominently rated (Culling et al., 1985; Nshemereirwe, 2016a). Several studies have also highlighted these two factors as key elements of EdTech adoption, implying that addressing socioeconomic disparities and ensuring robust institutional support is essential for overcoming barriers to EdTech adoption and achieving its full potential in educational settings.

The Level of UTTs' Socioeconomic Status across their Demographic Characteristics in Attitudes Formation toward EdTech Adoption at Busitema University

Several studies including the ones by Damani et al. (2022) and Okwakol et al. (2022) have noted that demographic characteristics such as age, gender, sponsorship, and subject combinations further influence students' SES amidst EdTech adoption. According to the studies conducted by Damani et al. (2022) and Okwakol et al. (2022), it was discovered that female students have less access to their caregivers' phones for learning purposes compared to their male counterparts. Among the various forms of EdTech, radio emerged as the most advantageous for girls' academic progress, with girls showing significantly greater interest in radio broadcasts than boys. Additionally, Short Message Service (SMS) messages had a stronger impact on boys from lower socioeconomic backgrounds compared to those from wealthier families. Beyond gender differences, students with more educated parents found SMS messages more beneficial, while phone calls from teachers notably enhanced younger students' self-confidence.

Sponsorship plays a critical role as well. Brames (2022) and Christen and Bower (2023) assert that students with financial support from scholarships or external sponsors are more

likely to have the resources necessary for effective EdTech adoption. This implies that when students receive financial support, they are not only better equipped to access the required technology but also tend to develop a more positive attitude toward adopting these technologies (Johnson et al., 2016).

In another study by Triplett (2023), it was also revealed that subject combinations influence the necessity and application of EdTech. Students in science, technology, engineering, and math (STEM) fields often have greater exposure and requirements for technology integration compared to those in the humanities (Jamaluddin et al., 2023; Maqoqa, 2023; Stohlmann et al., 2020). This indicates that financial and academic support tailored to students' specific contexts can enhance their engagement with EdTech.

These insights imply that SES is a crucial determinant of EdTech adoption, influencing access, attitudes, and overall engagement with technology. Addressing SES-related barriers is essential to ensure equitable access to EdTech and to harness its full potential in enhancing educational outcomes.

Institutional Support and Students' Attitudes toward EdTech Adoption

According to Zhao et al. (2020), institutional support plays a pivotal role in shaping students' attitudes toward EdTech adoption. Various forms of support, including technical assistance, training programs, and access to resources, can significantly influence how students perceive and engage with EdTech (Holden & Rada, 2011; Sharma & Srivastava, 2020). Adediran et al. (2023) assert that robust institutional support is essential for fostering positive attitudes and facilitating the effective integration of EdTech into educational practices building on studies by Daniel (2016) and Sharma and Srivastava (2020) that highlight that institutions providing adequate training programs and continuous technical support to students tend to see higher rates of EdTech adoption among their students. These programs not only enhance students' technical skills but also boost their confidence and willingness to use technology in their learning processes, showcasing that institutional investments in professional development

and technical infrastructure are crucial for promoting positive attitudes toward EdTech adoption (Johnson et al., 2016).

Furthermore, the availability of resources, such as computer labs, high-speed internet, and access to digital learning materials, significantly impacts students' attitudes toward EdTech (Crossley & McNamara, 2016; Smith & Hill, 2019). Studies by Bourdeaux (2017) and Kaahwa et al. (2022) indicate that students who have reliable access to these resources are more likely to develop positive attitudes and effectively utilize EdTech in their studies. This underscores the importance of resource availability in shaping students' engagement with technology.

Institutional policies and administrative support also play a critical role in promoting EdTech adoption. According to Daniel (2020), institutions with clear policies promoting the use of EdTech and providing incentives for its adoption see higher engagement levels among students. This includes policies that integrate EdTech into the curriculum and provide recognition or rewards for effective use (Daniel, 2020). Such policies create an environment that encourages students to explore and adopt new technologies, thereby enhancing their learning experiences (Mhlongo et al., 2023).

Studies by Kaahwa et al. (2022) and Mutenyo et al. (2022) further highlight the significance of institutional support in influencing students' attitudes towards EdTech creating gaps or digital divide in Uganda. Their studies indicate that the support offered by Ugandan institutions such as Universities varies. Institutions in urban areas tend to offer strong technical support and training programs as compared to rural areas.

Studies by Bond and Bedenlier (2019) and Haleem et al. (2022) also show that institutional culture and the overall technological climate of an institution can influence students' attitudes toward EdTech. Institutions that foster a culture of innovation and continuous improvement in technological integration see more enthusiastic adoption of EdTech among students. This implies that fostering a supportive and innovative institutional culture is vital for encouraging positive attitudes toward EdTech adoption.

However, several studies have shown that there is insufficient institutional support in terms of EdTech resources and training to encourage students to use EdTech in higher education institutions in developing countries. For instance, studies conducted by Buabeng-Andoh (2012), Crossley and McNamara (2016), and Habibu et al. (2012) reveal that many higher education institutions lack adequate funding and infrastructure to fully support the integration of EdTech into their curriculum. The institutions possess outdated hardware and software, limited access to high-speed internet, and insufficient training for faculty and staff on how to effectively utilize EdTech tools (Habibu et al., 2012; Johnson et al., 2016).

In addition, studies by Bourdeaux (2017) and Rodríguez Molina (2021) reveal that students generally express a desire to engage with EdTech for learning purposes, but they frequently face barriers such as inconsistent technology implementation in courses, a lack of technical support, and difficulty navigating complex digital platforms. These may imply that UTTs at Busitema University might be encountering the same challenges in EdTech adoption, hence the need for this study.

Relationship between UTTs' SES and Attitudes Towards EdTech Adoption

According to Cheng and Parker (2023), and Menyechi and Chukwumeka (2023), the level of UTTs' SES significantly influences their adoption of EdTech. Adediran et al. (2023), Bourdeaux (2017), and Heinz (2016) assert that students from higher SES backgrounds tend to have greater access to digital devices, high-speed internet, and other technological resources, facilitating their adoption of EdTech. Kaahwa et al. (2022) explored the impact of SES on students' access to EdTech and found similar patterns, where students from higher SES backgrounds had better access and more positive attitudes towards EdTech. However, students from lower SES backgrounds may face barriers such as limited access to devices and unreliable internet connectivity, hindering their ability to effectively utilize EdTech resources (Adediran et al., 2023; Ceviker & Gezer, 2023; Crossley & McNamara, 2016; Gottschalk & Weise, 2023). This digital divide exacerbates existing inequalities in educational outcomes and

opportunities among students, including UTTs (Kaahwa et al., 2022). The cited studies gave insight into SES-related disparities in access to technology, demonstrating their influence in creating significant barriers to EdTech adoption, ultimately affecting students' academic performance and future opportunities (Johnson et al., 2016).

The Moderation Effect of Institutional Support on the Relationship between UTTs' SES and their Attitudes toward EdTech Adoption

As one of the key antecedents, Institutional support plays an important role in facilitating EdTech adoption (Garaika, 2020; Ravichandran & Shanmugam, 2023). Dangi and Mohamed (2021) suggest that the influence of institutional support could be examined as a moderating factor in the adoption of EdTech. Their study findings reveal that institutional support can moderate the acceptance behavior of accounting educators in terms of usefulness, ease of use, and attitudes towards the behavioral intention to use EdTech (Dangi and Mohamed, 2021) however, it has no interaction effect on conscientiousness According to the Office of Educational Technology (2024), by providing comprehensive support mechanisms, academic institutions can effectively mitigate the influence of SES on EdTech adoption. This could help in promoting equitable access and enhancing the educational experiences and outcomes of all teacher trainees.

Buabeng-Andoh (2012) and Dintoe (2018) emphasize that elements such as policies, infrastructure, and training initiatives are crucial for the successful adoption and integration of EdTech. Teacher training institutions that prioritize the development of infrastructure, including access to digital devices, high-speed internet, and learning management systems create an enabling environment that facilitates the adoption of EdTech among UTTs from diverse socioeconomic backgrounds (Milburga, 2020).

Full digital training for both lecturers and UTTs improves teacher trainees' digital literacy skills and confidence in utilizing EdTech tools, bridging the SES gap (Mugiraneza, 2021). Alvino et al. (2014) state that institutional policies that advocate for the integration of

EdTech into curriculum design and teaching practices provide a level playing field for all teacher trainees, irrespective of their SES, to explore innovative pedagogical approaches. The availability of technical support services and helpdesk assistance, as part of institutional support, plays a crucial role in addressing technical challenges faced by teacher trainees from lower SES backgrounds (Bourdeaux, 2017). Institutions that invest in providing timely technical support demonstrate a commitment to supporting all teacher trainees in their use of EdTech tools, thereby reducing the SES-related barriers to technology adoption (Crossley & McNamara, 2016).

Despite the extensive existing literature on the influence of institutional support on EdTech adoption, no little or specific study has been conducted to examine institutional support as a moderating factor in the relationship between UTTs' SES and their adoption of EdTech. Thus, this study is paramount.

Challenges Encountered in Adopting EdTech

Despite the global push towards integrating technology into education, challenges persist in EdTech adoption worldwide (Johnson et al., 2016). Disparities in EdTech adoption are witnessed, with Sub-Saharan African countries, including Uganda, facing significant hurdles in ensuring equitable integration in teacher training programs (Daniel, 2020; Nyakito et al., 2021; Adediran et al., 2023). Various studies have highlighted these challenges. For example, Ezumah (2020) has categorized challenges that thwart the success of EdTech adoption in Africa into two: micro and macro challenges. He asserts that these challenges range from personal to community, cultural, infrastructural, policy, inadequate training, or absolute lack of training (Ezumah, 2020). Micro challenges include perceived usefulness and ease of use, technological anxiety, resistance to change, and privacy and security concerns; while macro challenges are organizational inertia, cost and resource constraints, interoperability issues, and regulatory and legal barriers (Talwar et al., 2023). According to Ezumah (2020), conducting a preliminary needs assessment is critical to determining which technology best

meets the specific requirements of a school or region. In addition, he advocated for the use of formative and summative evaluations to assess performance and find areas of improvement.

In another study on "*Impact of e-Registration on the Quality of Assessment Resources at the Ugandan National Examinations Board examination centers***",** Capuc andAtibuni (2018) identified poor physical infrastructures such as internet, power failure, computer viruses, and hardware and software breakdown; ill-trained personnel to handle the process; and financial constraints as the major challenges facing e-registration in Uganda. They then recommended that, government investment in ICT and electricity development as well as training of the personnel handling e-registration to effectively address the challenges (Capuc & Atibuni, 2018).

In a two-year study conducted in Kenya to determine the challenges affecting the adoption of e-learning among University students in Kenyan Universities, Mutisya and Makokha (2016) confirm the above challenges by revealing that students in Kenyan universities face insufficient internet connectivity, denial of copyrights for their developed e-learning modules, limited ICT skills, lack of incentives, shortage of computers/laptops, inadequate computer laboratories, and insufficient time challenges for online interaction. They then proposed that universities should invest extensively in improving e-learning infrastructure, developing e-learning materials, growing capacity, changing attitudes, and increasing e-learning awareness (Mutisya & Makokha, 2016).

Meanwhile, Andoh (2012) found that the most significant challenges in Ghana were limited teacher ICT skills, confidence, and pedagogical training, a scarcity of suitable educational software, limited ICT access, rigid traditional education systems, and restrictive curricula. More literature on the manifest challenges reveals that high costs, lack of, or inadequate training for teachers to fully implement the technology in classrooms, lack of infrastructure and power supply, and so on, are the major hindering conditions of EdTech

adoption in higher education institutions. Latent challenges such as inadequate evaluations are also detrimental to EdTech adoption (Adediran et al., 2023).

In Tanzania, Webb (1985) conducted a study to examine challenges facing students in Tanzanian Universities. The study found that university students often experience several challenges. These challenges are mainly associated with a lack of a systemic approach to ICT implementation, inadequate awareness, and attitudes towards ICTs among stakeholders, insufficient administrative support, limited technical support, failure to transform traditional practices to accommodate ICTs, inadequate staff development, lack of ownership of ICT policies and plans, and inadequate financial resources. The study then recommends that a systemic approach to ICT implementation, with clear policies and strategic plans tailored to the institution's needs and stakeholders' interests should be adopted (Webb, 1985). Awareness programs, staff training, and continuous support should be considered to be vital to address challenges and promote effective ICT integration (Webb, 1985). The study also recommends that innovative strategies such as adopting freeware and open-source software and diversifying funding sources to sustain ICT initiatives should be employed to minimize financial constraints. The study further considers collaborative efforts and stakeholder engagement essential to overcoming these challenges and ensuring successful ICT implementation in higher learning institutions (Webb, 1985).

A collaborative study conducted by Ahmad et al., (2023) on reviewing the challenges and constraints encountered in adopting online learning over the past two decades, revealed there is a need that thoroughly assess the environmental, social, and economic impacts of implementing eLearning initiatives and strive for their accessibility, fairness, and long-term viability.

In his study on comparison of challenges facing students in the early years and recent years of EdTech adoption, Mohammed (2020) found out that challenges such as inadequate technical support, awareness, institutional preparedness, quality of online course content, and

faculty members' limited IT skills have been persistent in the early years of EdTech adoption. He also identified factors such as self-efficacy, financial constraints, technological readiness, pedagogical approaches, socio-economic dynamics, digital proficiency, compatibility, and infrastructural limitations as significantly influential factors in the adoption of EdTech in higher education institutions in recent years (Mohammed, 2020).

In Uganda, as in other developing countries, university students, including UTTs, have several hurdles when it comes to implementing EdTech (Milburga, 2020). Among these hurdles, is the limited access to technology infrastructure and resources, particularly pronounced in rural locales (Bland et al., 1996; Ghaffar, 2016). Studies such as those conducted by Ghavifekr et al. (2006), Ghavifekr and Rosdy (2015), and Kennedy (2023) have underscored the dearth of adequate facilities and equipment in many teacher-training institutions, hampering trainees' ability to cultivate proficiency in utilizing EdTech tools. Moreover, the quality and consistency of training on technology integration across teacher training programs vary significantly (Backfisch et al., 2021). While certain institutions may offer robust and up-to-date instruction, others provide scanty or outdated guidance, leaving trainees ill-equipped for the evolving demands of contemporary classrooms (Spiel et al., 2013)

Socioeconomic factors, such as the affordability and accessibility of personal devices, also often pose considerable challenges (Olanrewaju et al., 2021; Afzal et al., 2023). In their study, Amos et al. (2024) argue that many teacher trainees in most Ugandan teacher training institutions lack access to personal computers or smartphones, inhibiting their engagement with technology-driven learning experiences and impeding the development of essential digital literacy skills. However, their study did not consider specificities among institutions and the teacher trainees).

Uganda's rich cultural and linguistic diversity according to Lubogo et al. (2023) also presents nuanced complexities for teacher trainees. Adapting technology-based resources and

tools to meet the different needs of students requires a deep awareness of local circumstances and cultural sensitivities (Sullivan, 2017).

All the above-mentioned challenges collectively underscore the influence of UTTs' socio-economic status and institutional support on EdTech adoption, highlighting the need for comprehensive solutions (Alone, 2017). Thus, prompting important inquiries for educational institutions and governments alike worldwide.

Wadi and Draxler (2002), and Ghavifekr and Rosdy, (2015) have acknowledged the escalating global demand for qualified and technologically competent teachers. EdTech becomes essential for instructors to satisfy the needs of students and align with the demands of modern society, as the education landscape transforms with initiatives such as competency-based curriculum (CBC) at Uganda's lower secondary school levels and the ever-changing world (Adediran et al., 2023; Kibaya, 2023).

During the first deployment of Busitema University LMS in 2021 (Busitema University, 2024), experts stated that the University could expect to confront the following issues within the first five years of implementation: need to integrate ICT services in the core functions of the University; the provision of high-speed internet across all the campuses to support open and distance learning (ODL), e-learning; provision of user-friendly and easily accessible web services; implementation of tight information security control for the existing and future ICT infrastructure; ensuring quality services through ICT technical support; and provision of cost-effective ICT environment in the era of increasing cost of software and the ever-changing technologies. The experts then suggested that the University invest in ICT to help with the integration and transformation process and ensure business continuity. The University then prepared an ICT strategic plan to ensure that ICT challenges are properly addressed. Despite the University's strategy, UTTs' engagement in EdTech activities such as LMS utilization and Zoom lecture attendance remains low. Thus, there is a need to explore the unique challenges that UTTs face in the adoption of EdTech at Busitema University.

Strategies Students Employ to Overcome Challenges they Encounter in Adopting EdTech

A study by Mtebe and Raphael (2018) on "*Key factors in learners' satisfaction with the e-learning system at the University of Dar es Salaam in Tanzania"*, revealed that students used power banks to mitigate power outrage challenges and sought financial support from home to purchase necessary devices. This reflects the role of familial support and financial security in enabling students to navigate e-learning barriers. A similar study was conducted by Wofford (2020) in the United States and revealed that students with limited financial resources often utilize public Wi-Fi hotspots during off-pick hours to enhance internet connectivity and download large-volume files such as videos. However, he cautioned about the security of public Wi-fi access points, expressing worries that Public Wi-Fi networks are at risk of being attacked due to vulnerabilities in their settings, administration, and security protocols (Wofford, 2020). He further asserts that attackers utilize several attack vectors including rogue access points to public Wi-Fi, which renders the use of public Wi-fi insecure and dangerous for students (Wofford, 2020). These strategies however disagree with the strategies discovered in a study conducted by Mlitwa and Van-Belle (2011) at the University of Cape Town on "*Mediators for Lecturer Perspectives on Learning Management Systems at Universities in The Western Cape, South Africa*". Their findings revealed that students primarily utilized university-provided online resources and on-campus IT support to address technical issues, rather than relying on VPNs or power banks.

Another study by Pete (2019) in South Africa, revealed that students frequently employed self-education strategies and budgeted for data expenses to manage the costs of online learning. This mitigated the challenges such as low access to tutors and institutional resources, demonstrating a high level of self-regulation and intrinsic motivation among students, which are crucial for successful e-learning. However, a study on " *Collaborative Learning: a Key To Enhance Students ' Social Interaction"* by Ghavifekr (2020) in Malaysia disagrees with the finding Pete's (2019) findings, revealing that students in his study

collaborated with faculty members to develop personalized learning plans and received institutional support for acquiring necessary gadgets.

In another study on "*Social support, computer self-efficacy, online learning engagement and satisfaction among undergraduate hospitality students***"** in Ghana, Mensah et al. (2024) observed that students adopted peer support and collaboration as a critical strategy for solving their EdTech-related challenges. Students borrow gadgets, share data costs, and seek assistance from friends, highlighting the importance of interpersonal relationships and community in overcoming challenges and enhancing UTTs' self-efficacy. A Similar study by Mtebe and Raisamo (2014) in Tanzania also underscored the significance of peer support and collaboration among students in overcoming technological challenges, emphasizing the importance of social support in enhancing students' self-efficacy and motivation. However, a study in India by Delavallade et al. (2019) found that students receive adequate university-led training programs and workshops to improve their digital literacy, reducing their reliance on peer support for navigating EdTech tools.

These varying strategies highlight the diverse approaches students adopt based on the environment, resources, and support available at their respective institutions and countries, prompting the exploration of the strategies UTTs employ in overcoming challenges they encounter in adopting EdTech at Busitema University.

Gaps in the Current Literature

Inadequate Research on Assessing UTTs' Attitudes toward EdTech Adoption at Busitema University

While previous studies such as those by Kaweesi et al. (2022) and Ujeyo et al. (2022) at Busitema University, and numerous other studies worldwide, have tried to provide valuable Insights into the extent of EdTech adoption among UTTs at Busitema University, there remains a significant gap in comprehending the UTTs' overall attitudes toward EdTech activities, particularly within the Busitema University context. Thus, this study attempts to address and

bridge the research literature gap by conducting an empirical study to assess the UTTs' overall attitude level of EdTech adoption in terms of Busitema University.

Limited Studies on the Relationship between UTTs' SES and their Attitudes toward EdTech Adoption at Busitema University

A critical contextual gap in the current literature is the scarcity of studies specifically addressing the relationship between UTTs' SES and their attitude toward EdTech adoption at Busitema University. While numerous studies such as by Manyiraho and Atibuni (2021) acknowledge the influence of SES on EdTech adoption among students, there is a notable dearth of in-depth investigations into the influence of UTTs' SES on their attitude toward EdTech adoption, particularly in the context of Busitema University. Understanding how UTTs' SES affects their attitudes toward EdTech adoption at Busitema University is essential for developing targeted interventions to bridge existing disparities. The literature has therefore called for a comprehensive empirical study that delves into the intricacies of UTTs' SES and their effective EdTech adoption at the University.

Limited Research on the Moderating Role of Institutional Support on the Relationship between UTTs' SES and their Attitudes toward EdTech adoption

While studies such as by Zhao et al. (2020) recognize the significance of both SES and institutional support as independent factors influencing EdTech adoption, there is a dearth of research that systematically investigates how institutional support acts as a moderator, influencing the strength and nature of the relationship between UTTs' SES and their EdTech adoption. Understanding how institutional support mitigates or exacerbates the effect of SES on EdTech adoption is vital for developing targeted interventions and policies that address the specific needs of UTTs.

Inadequate Empirical Research on Specific Challenges facing UTTs in EdTech Adoption at Busitema University

Despite the fact that the current literature highlights various challenges that students encounter when adopting EdTech around the world, there has been little research undertaken in the context of Busitema University, particularly with UTTs. Although experts who developed the university LMS had anticipated or predicted various obstacles to face students and staff while utilizing the Busitema University LMS in the first five years of its deployment in 2021, no or little empirical study has been undertaken to prove that these challenges exist. Thus, the study will contribute to closing this literature gap.

Limited Empirical Research Evidence on Specific Strategies UTTs Employ to Adopt EdTech at Busitema University amidst their varied SES.

While numerous studies propose strategies for equitable adoption of EdTech, there's a significant gap in empirical evidence regarding strategies specifically employed by UTTs at Busitema University. This contextual gap highlights the need for localized research to understand how UTTs at Busitema University currently adopt EdTech amidst their varied SES.

No clear or Published ICT in Education or EdTech Policy at Busitema University

Current literature shows that Ugandan Universities such as Makerere University (Makerere University, 2020) and Kyambogo University (Kyambogo University, 2015) have well-established and published ICT integration in Education policies, however, Busitema University does not have one. Although the focus of this study may not be directly linked to addressing this literature gap, there may be a need to resolve it to ensure the smooth running of the EdTech activities at the University.

Thus, this study attempts to address and bridge the research literature gap by conducting an empirical study to assess the UTTs' overall attitude level of EdTech adoption in terms of Busitema University.

Chapter Three
Methodology of the Study

Overview of the Chapter

This chapter contains the methodological techniques and tools employed in this research and details how the research was conducted. The chapter covers research design, target population and sample size, sampling technique(s), data collection procedure and instruments, data quality control (validity and reliability of instruments), data presentation and analysis, and ethical considerations.

Research Design of the Study

This study adopted a converging (concurrent) parallel mixed methods design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of the study variables (Creswell, 2009; Dawadi et al., 2021; Ngamvichaikit, 2015). The quantitative approach was employed to assess the descriptive characteristics of the study variables by using a questionnaire containing closed-ended questions with different options to be selected by the respondents according to their characteristics and feelings. This helped establish the relationships between variables such as demographic characteristics, UTTs' SES, perceived institutional support, and UTTs' attitudes toward EdTech adoption (Amin, 2005; Manjunatha, 2021). Whereas, the qualitative approach employed an interpretative phenomenological approach, which involved the use of open-ended questions in the same questionnaire to delve deeper into the lived experiences of the respondents regarding the challenges they faced (objective 6) and strategies they employed in overcoming the challenges in EdTech adoption (objective 7) at Busitema University (Creswell, 2009), while also providing rich or detailed insights that complement the quantitative results for objectives (2 and 3) (Nyumba et al., 2018). The combination of these methods thus enabled a thorough exploration of the target population's opinions, preferences, practices, concerns, challenges, and strategies related to EdTech adoption at Busitema University (Toyon, 2021).

However, during data collection, cross-sectional survey design was particularly employed to collect both quantitative and qualitative data. This design was chosen because it allows data collection from a large sample of UTTs with different demographics at the same time (Amin, 2005; Manjunatha, 2021). This design was indeed effective, allowing the researcher to administer the questionnaires consisting of both closed-ended and open-ended questions in the shortest time possible (Creswell, 2009; Nyumba et al., 2018).

Population and Sample Size

The study initially targeted 550 respondents, including 280-year ones, 98-year twos, and 172-year threes, and a sample size of 226 was determined based on Krejcie and Morgan's (1970) recommendations. However, 24 extra respondents were added to the sample to cater for attrition, making the sample size increase to 250 UTTs as shown in Table 1 below. The study was conducted with a 95% confidence level and a 5% margin of error.

Table 1: Showing Target Population, Sample Size and Sampling Technique

Year of Study	Population	Sample	Sampling Technique
I	280	127	Simple Random sampling
II	98	45	Simple Random sampling
III	172	78	Simple Random sampling
Total	**550**	**250**	

(Source: Busitema University Faculty of Science and Education records, 2024)

Sampling Technique (Simple Random Sampling)

Simple random sampling technique was employed to collect data from the respondents present at that time by giving them equal chances to participate in the study and to meet the target sample using the lottery or goldfish bowl method. This technique helped to select 250 UTTs from the target population of 550 UTTs, exceeding the initial sample size of 226 (based on Krejcie and Morgan's table) catering for attrition to represent the overall population of UTTs. The process involved gathering UTTs by year in their respective lecture rooms and then giving them an equal chance by asking them to participate at will and playing a YES/NO game to make up the required sample. This was done each year until the overall required sample of

250, including the attrition, was achieved. The technique was indeed helpful because it provided every available individual an equal chance of selection, thus minimizing selection bias and ensuring that the sample is representative of the broader population (Lohr, 2019; Cochran, 1977). It also made it possible to have clear and accurate data since the respondents were not forced to participate.

Data Collection

This section contains details about the instruments and procedures employed to collect both primary and secondary data for this study.

Data Collection Instruments: Questionnaire

To ensure that adequate data was collected from a large number of respondents (250 UTTs) in the shortest time possible, questionnaires containing both closed-ended questions (for collecting quantitative data) and open-ended questions (for collecting qualitative data primarily meant to gain more insights about the quantitative data) were prepared. See Appendix B Closed-ended questions focused on gathering descriptive quantitative data about UTTs' demographics, SES, institutional support, and attitudes toward EdTech adoption. These questions or items and validated scales were adapted from other researchers to ensure the high validity of the items (Aithal, 2020). Whereas, open-ended questions were designed under the guidance of the supervisors to delve into and gather more data about UTTs' experiences on their SES, institutional support, specific challenges they face, and strategies they employ in adopting EdTech at Busitema University. The questionnaire development process also involved careful consideration of content validity and reliability to ensure the robustness of the instrument (Richard, Bagozzi, 2017).

Data Collection Procedure

Upon approval of the proposal and questionnaire, the researcher then went to the field to collect data, first for pilot testing and later for the whole study. The data was collected from primary sources. This data included both quantitative and qualitative data (Buchanan, 1981;

Johnson & Christensen, 2017; Taherdoost, 2021). Both data were collected using questionnaires (Buchanan, 1981; Johnson & Christensen, 2017). With the help of well-established lecture rooms and lecture timetables, I (the researcher) used my one-hour lecture periods for each year to administer or fill out the questionnaires. Participation in the study or filling out the questionnaires was totally at the will of the respondents. Although the questionnaires had clear guidelines, I still kept around guiding the respondents as they filled the questionnaire, especially in areas where they needed more guidance. After collecting the questionnaires from the respondents, they were then sorted, and the filled ones were numbered for easy identification. The ones not fully filled were rendered invalid. The fully filled Quantitative parts of the data were then entered into SPSS and cleaned to ensure quality data before analysis, while qualitative data parts were well transcribed by forming themes, sub-themes, and patterns in a table using a word processor (Johnson & Christensen, 2017; Mack et al., 1989).

Data Quality Control

Pilot Study

A pilot study was conducted to determine the validity and reliability of the questionnaire. Data for the pilot study was collected from a sample of 50 respondents (comprising 30 Higher Education Access Certificate (HEAC) students, 10 Bachelor of Information Technology (BIT), and 10 Computer Science students, who are not part of the study), and the following results for validity test and reliability analysis were as shown in Table 2 below.

Table 2: Showing Validity and Reliability of the Questionnaire Results

Variable	No. of Items	Cronbach's Alpha	CVI
UTTs' SES	20	.811	.800
Attitudes toward EdTech adoption	34	.822	.912
Institutional Support	15	.801	.867

Source: primary data, 2024.

Validity of the Study Instruments

Gillespie and Chaboyer (2013) define validity as the extent to which the study instruments accurately and comprehensively measure the constructs they are intended to measure. In this study, the validity test of questionnaire items was determined using the content validity index (CVI) formula, and a high average CVI (CVI = 0.860) was obtained, indicating that the questionnaire items were highly valid and relevant to the study. This was possible because the questionnaire went through various pretests under the supervision of my two supervisors (well-experienced professors). The supervisors and I evaluated the relevance of each item in the questionnaire about the research objectives and rated them from the most relevant to the least, and then the following content validity index (CVI) formula was used to calculate the validity as shown in Table 2 above:

$$\textbf{CVI} = \frac{\textbf{Number of items content highly relevant}}{\textbf{The total number of items in the questionnaire}}$$

CVI for UTTs' SES = $\frac{16}{20}$ = 0.800

CVI for UTTs' attitudes toward EdTech adoption = $\frac{31}{34}$ = .912

CVI for Perceived Institutional Support = $\frac{13}{15}$ = .867

From Table 2, the CVI values for the SES, EdTech adoption, and institutional support were 0.800, 0.912, and 0.867, respectively. According to Newman (2013), an instrument is considered to be valid when its CVI values are at least 0.700. The average CVI value is 0.860, which is higher than the critical CVI value (0.700). This implies that the questionnaire contains highly valid items for the study.

Reliability of the Questionnaire

Bolarinwa (2015) defines reliability as the consistency and stability of questionnaire measurements or results. In the context of this study, the reliability analysis was determined using Cronbach's Alpha values. Cronbach's Alpha is a measure of internal consistency, indicating how well the items in a scale measure the same underlying construct. From Table 2,

the results indicate that the Cronbach's Alpha values for SES, EdTech adoption, and institutional support scales, which consisted of several items of 20, 34, and 15, were 0.811, 0.822, and 0.801, respectively, which are high. This implies that the items within each scale consistently measure their respective constructs, making the questionnaire a reliable tool for the study.

Data Management

Each time upon completing filling up, the questionnaires were collected from all respondents, counted, and kept under the full custody of the researcher, and this was done till all the years were assessed. Then sorting and numbering were carried out to check whether the questionnaires were fully filled or not. Those that were fully filled were identified and numbered for easy identification, and those partially filled were rendered invalid. For the case of the quantitative data part (closed-ended items), codes or variables were developed in the SPSS following the questionnaire for entering the data. Data cleaning and transformations were then carried out to prepare it for proper analysis and interpretation.

Qualitative data obtained from the open-ended questions were transcribed using a word processor and interpreted, through coding and categorizing them into themes and subthemes related to study objectives.

Backups such as keeping copies of data in various devices and platforms such as external hardware and email or Google Drive were also done to minimize cases of data loss (Chandramouli & Pinhas, 2020).

Measurement of Variables

Various standard scales were adopted to measure the study variables basically for the quantitative data, although, Nominal, and Scale (which represent both interval and ratio levels) were the two main measurement types considered to measure the data in the SPSS. Nominal was used for demographics except for age (Scale) and Scale for the main study variables (UTTs' SES, Institutional support, and UTTs' attitudes toward EdTech adoption). SES was categorized into two: Household status and accessibility to personal EdTech resources. Measurement for

Household status did not have a specific scale because the items had a varied number of alternatives for example family earnings had 8 alternatives while level of education had 10. However, for accessibility to EdTech resources, Yes /No was used. (see appendix 1).

For the case of Institutional support and attitudes toward EdTech adoption, 5 points Likert-scale measurement: 1–Strongly disagree, 2–Disagree, 3–Neutral, 4–Agree, and 5-Strongly agree was adopted (Rodway & Schepman, 2023). However, a reverse score was done for the negative statements such as obstruction issues, during coding.

Transformation was also carried out by obtaining the means of the variables. These means were in turn transformed into different recodes to give estimated variable levels (i.e. as low (1), moderate (2), and high (3)). For the case of measuring UTTs' attitudes toward EdTech adoption, the levels: were low, moderate, and high, with mean negative, moderately positive, and positive attitudes respectively. The highest Mean score for UTTs' SES was 4.00 obtained by summing up the highest or maximum values of the items which were then divided by 20 (total number of items), whereas, 5.00 was the maximum value for Perceived institutional support and UTTs' attitudes toward EdTech adoption as determined by 5point Likert-scale measurement. Table 3 indicates the legend of the mean scores and levels.

Table 3: Measurements

Variable	Level		
	Low (1)	**Moderate (2)**	**High (3)**
UTTs' SES	1.00 - 1.99	2.00 – 2.99	3.00 – 4.00
Perceived Institutional Support	1.00 – 2.33	2.34 – 3.66	3.67 – 5.00
UTTs' Attitudes toward EdTech Adoption	1.00 – 2.33	2.34 – 3.66	3.67 – 5.00

Source: Primary data, (2024)

Data Analysis

After collecting both quantitative and qualitative data from the field using the questionnaires containing both closed-ended and open-ended questions. The data was then entered into the respective data analysis tools (SPSS for Quantitative and Microsoft Word for

qualitative data) for analysis. This was followed by data cleaning to ensure high-quality data. Then the sequential analysis started following the research design and the specific objectives.

Quantitative Data Analysis

After cleaning the data, the transformation was then carried out by getting the means of different entities of the variables. The analysis process then started by first carrying out normality and reliability tests to check the suitability of the data (Varsha et al., 2017). This was followed by the analysis of the preliminary information which included: the response rate of respondents, demographics, and descriptive statistics of the variables. The response rate of the respondents was analyzed by comparing the number of respondents with the sample size and expressed as a percentage of the sample. This was followed by an analysis of the demographic characteristics of respondents, and then an analysis of descriptive statistics of the variables.

The analysis by objectives followed is shown in Table 3 below. The analysis here mainly focused on establishing descriptive statistics of variable entities and the relationships or correlations between the variables, covering the first 4 objectives (objectives 1, 2, 3, and 4). Results in the form of frequencies, percentages, ranges, means, standard deviations, correlation coefficients, ANOVA, t and beta (β) values, etc. were obtained, and presented in tables and graphs for better interpretation and discussion (Guglielmetti et al., 2022; Mweshi & Muhyila, 2024). Quantitative data analysis was then followed by qualitative analysis to elaborate more or to give reasons for the statistical results.

Qualitative Data Analysis

Qualitative data from open-ended questionnaires underwent thematic content analysis in a tabular form using a Word document (Aldaihani, 2021; Hadush et al., 2017; Lubon et al., 2018; Singla & Agrawal, 2024). Themes and patterns related to SES, institutional support, attitudes toward EdTech adoption, challenges, and strategies were formed. This qualitative analysis provided a rich, context-specific understanding of respondents' experiences and

perspectives. Qualitative data supported more in interpreting the quantitative findings providing a broader understanding of the reasons proving the statistical results.

Table 4: Summary of Data Analysis Process by Objective (For more details see Appendix D)

SNO.	Objective	Data Analysis process
1.	To examine the level of UTTs' attitudes toward EdTech Adoption across demographic characteristics among UTTs at Busitema University.	Crosstabulation descriptive statistics was performed for Levels of EdTech adoption across demographic characteristics. Mann-Whitney U and Kruskal-Wallis Tests were also carried out to determine whether relationships between the demographics and the variable are significant or not, and also to determine the differences across the demographics.
2.	To assess the level of UTTs' SES across their demographic characteristics in attitudes formation toward EdTech adoption at Busitema University.	The same analysis process in objective 1 was also used for this objective. However, further analysis was done to check variations in a sample of SES entities. This was done by evaluating their frequencies and percentages of the ratings: Strong Disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The results obtained were also compared or confirmed by the qualitative data from open-ended questions during interpretation and discussion to gain more insights.

3.	To assess the differences in UTTs' perceptions of the various institutional support received in EdTech integration.	Descriptive Statistics Analysis was carried out using frequencies, percentages, means, and standard deviation. Transcription of Qualitative data was also done
4 &5.	4. To assess the relationship between UTT's SES and their attitudes toward EdTech adoption at Busitema University. 5. To evaluate the moderation effect of Institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University.	Correlation analysis and Multiple linear regression analysis were carried out. Bivariate analysis was carried out to obtain Pearson Correlation coefficients. Then analysis moderation effect analysis was carried out using PROCCESS v4.2 by Andrew Hayes.
6.	To explore the challenges UTTs encounter in adopting EdTech at Busitema University.	Data transcription was first carried out where data was arranged in themes (Major challenges), and subthemes (sub-challenges), and analyzed following patterns were formed.
7.	To explore the strategies UTTs employ to overcome the challenges they encounter in adopting EdTech at Busitema University.	Done following the same procedure in objective 5.

(Source: researcher, 2024)

Ethical Considerations

Throughout the study, ethical guidelines and regulations were strictly followed. Approvals were made at every level of the study from the proposal level to the submission of the report through gatekeeping procedures. Progress reports were written and approved by the two supervisors.

I (the researcher) strictly adhered to the Principles of informed consent, ensuring voluntary and informed agreement (Henderson, 2011). Respondents were provided with detailed information about the study's purpose, procedures, benefits, and potential risks (Fischhoff et al., 1978).

Confidentiality and Anonymity were maximally accorded. Data was securely stored, and any identifiable information was kept confidential to ensure respondents' privacy (Czechowski & Sylvestre, 2019). The study highly prioritized the protection and well-being of respondents.

Respect for respondents was highly ensured, and a non-intrusive approach was employed during data collection to prevent any emotional or psychological harm to respondents (Dodds, 2023). Furthermore, the respondents had the right to withdraw from the study at any stage without penalty or consequence (Fernandez Lynch, 2020). They were assured that their decisions would not affect their relationship with the university or me (researcher).

As a researcher, I upheld high integrity and transparency throughout the study. Any conflicts of interest or biases were acknowledged, and the study was conducted in an ethical and unbiased manner (Mantzoukas, 2005). Access to data was only limited to authorized personnel, and data was stored securely in compliance with data protection laws (Banisar & Davies, 1999).

All sources of information in this study were acknowledged, with proper citations and referencing using APA 7 referencing style (Lamptey & Atta-Obeng, 2013). The research work

also underwent plagiarism check via the Turnitin software and met the education department's set standard which is less than 20% similarity index. See Appendix F.

Chapter Four

Results of the Study

Overview of the chapter

This chapter contains the presentation and interpretation of the results, which are organized according to the specific objectives of this study. The chapter begins with a description of the response rate by respondents, then goes on to discuss the description of the demographic characteristics of the respondents, descriptive statistics of key variables, and the analysis and interpretation of the specific objectives.

The response rate of Respondents

The response rate of the respondents was analyzed to establish whether the targeted number of respondents (sample size (n)) has been fulfilled or not. It was therefore established that the turnup of the respondents was 250 (100%), although other participants (09) did not fully fill out the questionnaire rendering them invalid. The summary of the rate of the respondents is shown in Table 5 below:

Table 5: Shows Response Rate of Respondents

Item	Frequency	Percentage
Target Sample size	250	100%
Rate of Response	250	100%
Accepted number (valid)	241	96.4%
Invalid	09	3.6%

Source: ***Primary data (2024)***

Demographic Characteristics Analysis

The demographic characteristics consisted of the year of study, subject combination, sex, type of sponsorship, private sponsor, and age of the respondents. The respondents were asked to fill in their details in those various entities, and the results in Table 6 below were obtained.

Table 6: Shows Demographic characteristics of respondents

Item	Category	Frequency	Percent (%)
Year of Study	Year I	99	41.1
	Year II	66	27.4
	Year III	76	31.5

	Total	241	100.0
Subject Combination	MAT/ICT	32	13.3
	ECO/ICT	4	1.7
	GEO/ICT	11	4.6
	PHY/ICT	1	.4
	MAT/CHEM	53	22.0
	MAT/ECO	5	2.1
	MAT/GEO	3	1.2
	AGRIC II MAIN	36	14.9
	ELS	24	10.0
	BIO/CHEM	27	11.2
	BIO/PE	9	3.7
	PHY/MAT	27	11.2
	ENT/ICT	6	2.5
	MAT/ENT	3	1.2
	Total	241	100.0
Sex	Male	162	67.2
	Female	79	32.8
	Total	241	100.0
Type of the sponsorship	Government Sponsor	13	5.4
	Private Sponsor	228	94.6
	Total	241	100.0
Category of Private Sponsorship	Mother	42	18.4
	Father	129	56.6
	Mother and Father	18	7.9
	Uncle	9	4.0
	Aunt	2	.9
	Loan Scheme	11	4.8
	Other private scholarship	17	7.5
	Total	228	100.0
Age	20-24	198	82.2
	25-29	41	17.0
	30-34	1	.4
	35-39	1	.4
	Total	241	100.0

Source: ***Primary data, (2024)***

Results in Table 6 indicate that the demographic characteristics consist of a sample of 241 respondents with a diverse distribution across various categories. The largest group of respondents were first-year students, 99 (41.1%), and the least were second-year students, 66 (27.3%). Meanwhile, subject combinations varied, with the MAT/CHEM combination having the highest population of UTTs, 5 (22.0%), followed by Agriculture Double Main (AGRIC II MAIN) making, 36 (14.9%), and the least was MAT/GEO with 3 UTTs (1.2%). According to sex, the majority of respondents were found to be males, 162 (67.2%). The findings also

revealed that most UTTs were privately sponsored, 228 (94.6%), primarily by their fathers 129 (53.5%) or mothers 42 (17.4%). The predominant age group is 20-24 years, 198 (82.2%), and minimal respondents aged 30-34 and 35-39 (each 0.4%).

Mean Scores and Levels of the Study Variables

The statistical descriptors for the three main study variables were produced to check whether the data was drawn from a normally distributed population using means and standard deviation. The results are indicated in Table 6 below.

Table 7: Shows Descriptive Statistics of Mean Scores and Levels of the Study Variables

Variable	Minimum	Maximum	Mean	Std. Deviation	Level
The mean of Attitudes toward EdTech Adoption	2.14	4.57	3.38	.46	Moderate
Mean of UTTs' SES	1.05	3.45	2.21	.55	Moderate
Mean of Institutional support	1.40	4.47	2.74	.60	Moderate

Source: ***Primary data (2024)***

The results in Table 7, reveal a moderate mean score for UTTs' attitudes toward EdTech adoption (Mean = 3.38, SD = 0.46). This implies that UTTs at Busitema University have a relatively positive attitude towards EdTech adoption, predominantly at moderate levels. UTTs' SES also has moderate mean scores (Mean = 2.21, SD = 0.55), implying that the majority of the UTTs at Busitema University come from households with relatively moderate SES or have moderate access to EdTech resources. Similarly, the mean score for institutional support was moderate (Mean = 2.74, SD = 0.60), indicating that UTTs receive a moderate level of institutional support for EdTech adoption.

Objective 1: Assessing the Level of EdTech Adoption across Demographics Characteristics of UTTs at Busitema University

Crosstab Descriptive statistics considering frequencies and percentage, and non-parametric tests: Mann-Whitney U and Kruskal-Wallis Tests were also carried out here to determine the levels and test the significance levels in attitudes toward EdTech adoption across the demographics, and the results obtained are shown in Table 8 below.

Table 8: Shows Demographics and Level of EdTech Adoption

Entity	Sub-entity	Level of EdTech Adoption			Total n((100.0%)	*Mean Rank*	*Chi-Sq/MWU*	*p*
		Low n(%)	Moderate n(%)	High n(%)				
Year of Study	Year I	1(1.0)	84(84.8)	14(14.1)	99	100.57	18.73	.000 (Sig)
	Year II	0(0.0)	49(74.2)	17(25.8)	66	122.23		
	Year III	1(1.3)	44(57.9)	31(40.8)	76	146.54		
Total		2(0.8)	177(73.4)	62(25.7)	241			
Subject Combination of the UTT	MAT/ICT	0(0.0)	21(65.6)	11(34.4)	32	142.48	18.39	.143 (Not Sig)
	ECO/ICT	0(0.0)	4(100.0)	0(0.0)	4	120.50		
	GEO/ICT	0(0.0)	6(54.5)	5(45.5)	11	151.32		
	PHY/ICT	0(0.0)	1(100.0)	0(0.0)	1	67.50		
	MAT/CHEM	1(1.9)	34(64.2)	18(34.0)	53	133.03		
	MAT/ECO	0(0.0)	3(60.0)	2(40.0)	5	121.90		
	MAT/GEO	1(33.3)	2(66.7)	0(0.0)	3	36.67		
	AGRIC II MAIN	0(0.0)	32(88.9)	4(11.1)	36	101.69		
	ELS	0(0.0)	19(79.2)	5(20.8)	24	117.10		
	BIO/CHEM	0(0.0)	18(66.7)	9(33.3)	27	126.39		
	BIO/PE	0(0.0)	8(88.9)	1(11.1)	9	94.33		
	PHY/MAT	0(0.0)	23(85.2)	4(14.8)	27	104.06		
	ENT/ICT	0(0.0)	4(66.7)	2(33.3)	6	134.00		
	MAT/ENT	0(0.0)	2(66.7	1(33.3)	3	90.33		
Total		2(0.8)	177(73.4)	62(25.7)	241			
Sex of the UTT	Male	0(0.0)	116(71.6)	46(28.4)	162	126.49	5510.00	.080 (Not Sig)
	Female	2(2.5)	61(77.2)	16(20.3)	79	109.75		
Total		2(0.8)	177(73.4)	62(25.7)	241			
Type of the sponsorship	Government Sponsor	4(30.8)	6(46.2)	3(23.1)	13	107.58	1307.50	.475 (Not Sig.)
	Private Sponsor	27(11.8)	142(62.3)	59(25.9)	228	121.77		
Total		31(12.9)	148(61.4)	62(25.7)	241			
Category of privately sponsored	Mother	0(0.0)	32(76.2)	10(23.8)	42	118.24	6.93	.328 (Not Sig)
	Father	1(0.8)	89(69.0)	39(30.2)	129	130.31		
	Mother and Father	1(5.6)	13(72.2)	4(22.2)	18	113.47		
	Uncle	0(0.0)	7(77.8)	2(22.2)	9	109.56		
	Aunt	0(0.0)	2(100.0)	0(0.0)	2	118.25		
	Loan Scheme	0(0.0)	9(81.8)	2(18.2)	11	87.18		
	Other private scholarship	0(0.0)	14(83.3)	3(16.7)	17	105.35		
Total		2(0.9)	167(73.4)	59(25.7)	228			
Age of the UTT	20-24	2(1.0)	147(74.2)	49(24.7)	198	120.64	2.52	.471 (Not Sig)
	25-29	0(0.0)	29(70.7)	12(29.3)	41	120.68		
	30-34	0(0.0)	1(100.0)	0(0.0)	1	97.50		
	35-39	0(0.0)	0(0.0)	1(100.0)	1	229.00		
Total		2(0.8)	177(73.4)	62(25.7)	241			

Source: ***Primary data, (2024)***

The results in Table 8 provide a detailed analysis of EdTech adoption levels among UTTs at Busitema University, examining demographic characteristics such as Year of Study, Subject Combination, Sex, Type of Sponsorship, Category of Private Sponsorship, and Age. The results explain how these characteristics influence varying levels of EdTech adoption as low, moderate, or high across the UTT population.

There was a distinct pattern in EdTech adoption across different years of study. Most UTTs in Year I, 84(84.8%), and Year II, 49 (74.2%) demonstrated moderately positive attitudes toward EdTech adoption, while a significant proportion of Year III students 31 (40.8%) adopted EdTech at a high level. The mean rank for Year III (146.54) was substantially higher than for Year I (100.57) and Year II (122.23), with (chi-square = 18.732; p = .000), indicating a statistically significant difference. This trend indicates that as students progress through their studies, their exposure to and familiarity with technology increases, leading to higher levels of EdTech adoption. This aligns with the TAM, which posits that perceived ease of use increases with experience, contributing to higher adoption levels among senior students (Saif et al, 2024). The moderate adoption level among Year I and Year II students implies that newer students might initially struggle with integrating EdTech into their studies, but their comfort and competence with the technology grew as they advanced in their studies. This progression may reflect a shift in attitudes, where initial apprehension is replaced by increased confidence and positive perceptions of EdTech's benefits.

The analysis of EdTech adoption across subject combinations reveals that certain combinations encourage higher levels of adoption than others, though no statistically significant variation was found (p = .143), with a chi-square (18.385). For instance, GEO/ICT students 5(45.5%) and MAT/ECO students 2(40.0%) exhibited high positive attitude levels of EdTech adoption, whereas other combinations like ECO/ICT 4(100%) and PHY/ICT 1(100%) were confined to moderately positive levels of attitudes toward EdTech adoption. The mean rank for GEO/ICT (151.32) and MAT/ICT (142.48) was higher than for combinations like

PHY/ICT (67.50), implying that subject combinations with a stronger emphasis on technology naturally encourage greater adoption, reinforcing TAM's notion that perceived usefulness drives technology adoption (Koul & Eydgahi, 2018). The demands of these subject combinations likely require frequent use of EdTech, fostering a positive attitude towards its adoption.

Sex differences in EdTech adoption were notable but not statistically significant (p = .080) and (MWU=5510.000). A larger proportion of male UTTs, 46(28.4%) adopted EdTech at a high level compared to females, 16(20.3%), though both groups primarily exhibited moderate adoption levels (males: 116, 71.6%; females: 61, 77.2%). The mean rank for males (126.49) was slightly higher than for females (109.75). These results indicate that male students may be more inclined toward higher levels of EdTech adoption, potentially due to differences in confidence with technology or access to resources. According to UTAUT, facilitating conditions, such as access to technology and prior experience, play a role in adoption, and these factors may be more favorable for male UTTs, allowing them to perceive EdTech as more beneficial (Venkatesh et al., 2003).

The type of sponsorship did not significantly impact EdTech adoption (p = .475), with MWU =1307.500, though privately sponsored UTTs, 59(25.9%) had relatively higher positive attitudes toward EdTech adoption compared to government-sponsored students 3(23.1%). The mean rank for privately sponsored students (121.77) was higher than for government-sponsored students (107.58). These findings indicate that privately sponsored students may have more financial flexibility and access to technological resources, enhancing their ability to adopt EdTech. In line with TAM and UTAUT, students with better financial backing are likely to perceive EdTech as easier to use and more useful, reinforcing the idea that facilitating conditions are crucial for technology adoption (Davis, 1989; Venkatesh et al., 2003). Government-sponsored UTTs, with potentially fewer resources, may face barriers to EdTech adoption, impacting their overall usage and attitudes.

The analysis of private sponsorship categories was not statistically significant (p = .328) with chi-square = 6.928, however, it revealed that UTTs sponsored by their fathers, 39(30.2%) or on private scholarships, 3(16.7%) had significantly higher levels of EdTech adoption. The mean rank for students sponsored by their fathers (130.31) and those on private scholarships (105.35) was higher than for other categories like loan schemes (87.18). This implies that consistent financial support from stable sources enables students to adopt EdTech at higher levels. This directly aligns with UTAUT, which posits that facilitating conditions such as financial security play a crucial role in fostering positive attitudes toward technology, making it easier for students to engage with EdTech when they receive substantial financial backing (Venkatesh et al., 2003).

Although age did not significantly influence EdTech adoption (p = .471) with chi-square = 2.521, younger UTTs aged 20-24, 147(74.2%) were predominantly moderate adopters, with 49(24.7%) adopting at a high level. Similarly, UTTs aged 25-29 followed this pattern, with 29(70.7%) adopting at a moderate level and 12(29.3%) at a high level. The mean rank for younger students (120.64) was slightly lower than for older students (120.68), indicating that age was not a major factor in determining UTTs' attitudes toward EdTech adoption. This consistency implies that EdTech adoption is not significantly hindered by age, although older students may have better access to technological resources and more exposure to digital tools. The lack of significant age-related barriers may align with TAM's concept of perceived ease of use, as older students might feel more comfortable with technology due to greater familiarity (Davis, 1989).

In general, although the results indicate that demographic characteristics play an important role in shaping UTTs' attitudes toward EdTech adoption, most respondents exhibit moderate adoption levels across all groups. The significant differences observed in terms of year of study highlight the importance of facilitating conditions such as access to technology,

financial support, and curriculum design influencing students' attitudes toward EdTech adoption.

Thus, the alternative hypothesis (H_1), which posits that " *There is a statistically significant moderate level of EdTech adoption across demographic characteristics of UTTs at Busitema University," was rejected*, particularly about the year of study. These insights underscore the need for targeted interventions to address the specific challenges faced by different demographic groups in their journey toward EdTech adoption, ultimately enhancing their ability to integrate technology into their teaching practices.

Objective 2: Assess the level of UTTs' SES by Demographic Characteristics at Busitema University

Crosstab Descriptive statistics considering frequencies and percentage, and non-parametric tests: Mann-Whitney U and Kruskal-Wallis Tests were also carried out here to determine the variations and test the significance levels in UTTs' SES across the various demographic characteristics, and the following results in Table 8 were obtained.

Table 9: Shows Demographics and Level of UTTs' SES

Entity	**Sub-entity**	**Level of UTTs' Socioeconomic Status**			**Total n(100.0%)**	***Mean Rank***	***Chi-Sq***	***p***
		Low n(%)	**Moderate n(%)**	**High n(%)**				
Year of Study	Year I	31(31.3)	51(51.5)	17(17.2)	99	103.47	11.165	.004 (sig)
	Year II	16(24.2)	29(43.9)	21(31.8)	66	128.61		
	Year III	14(18.4)	39(51.3)	23(30.3)	76	137.22		
Total		61(25.3)	119(49.4)	61(25.3)	241			
Subject Combination of the UTT	MAT/ICT	9(28.1)	15(46.9)	8(25.0)	32	118.69	18.232	.149 (not sig)
	ECO/ICT	1(25.0)	2(50.0)	1(25.0)	4	138.00		
	GEO/ICT	4(36.4)	4(36.4)	3(27.3)	11	122.45		
	PHY/ICT	0(0.0)	0(0.0)	1(100.0)	1	207.50		
	MAT/CHEM	13(24.5)	29(54.7)	11(20.8)	53	113.73		
	MAT/ECO	1(20.0)	3(60.0)	1(20.0)	5	128.80		
	MAT/GEO	0(0.0)	3(100.0)	0(0.0)	3	147.33		
	AGRIC II MAIN	10(27.8)	18(50.0)	8(22.2)	36	122.00		
	ELS	4(16.7)	10(41.7)	10(41.7)	24	148.98		
	BIO/CHEM	4(14.8)	10(37.0)	13(48.1)	27	144.13		
	BIO/PE	4(44.4)	5(55.6)	0(0.0)	9	67.50		
	PHY/MAT	9(33.3)	15(55.6)	3(11.1)	27	102.67		
	ENT/ICT	1(16.7)	3(50.0)	2(33.3)	6	112.58		
	MAT/ENT	1(33.3)	2(66.7)	0(0.0)	3	76.33		
Total		61(25.3)	119(49.4)	61(25.3)	241			
Sex of the UTT	Male	48(29.6)	77(47.5)	37(22.8)	162	113.34	5157.500	.014 (sig)
	Female	13(16.5)	42(53.2)	24(30.4)	79	136.72		
Total		61(25.3)	119(49.4	61(25.3)	241			

Type of the sponsorship	Government Sponsor	5(38.5)	6(46.2)	2(15.4)	13	89.23	1069.000	.091 (Not sig)
	Private Sponsor	56(24.6)	113(49.6)	59(25.9)	228	122.81		
Total		61(25.3)	119(49.4)	61(25.3)	241			
Category of privately sponsored	Mother	13(31.0)	18(42.9)	11(26.2)	42	102.79	4.973	.419 (Not sig)
	Father	25(19.4)	68(52.7)	36(27.9)	129	110.54		
	Mother and Father	4(22.2)	12(66.7)	2(11.1)	18	91.83		
	Uncle	2(22.2)	3(33.3)	4(44.4)	9	119.17		
	Aunt	1(50.0)	0(0.0)	1(50.0)	2	115.25		
	Loan Scheme	4(36.4)	5(45.5)	2(18.2)	11	75.73		
	Other private scholarship	8(43.0)	7(43.3)	3(17.7)	17			
Total		56(24.6)	114(50.0)	58(25.4)	228			
Age of the UTT	20-24	48(24.2)	95(48.0)	55(27.8)	198	125.79	9.055	.029 (sig)
	25-29	12(29.3)	24(58.5)	5(12.2)	41	98.02		
	30-34	1(100.0)	0(0.0)	0(0.0)	1	23.50		
	35-39	0(0.0)	0(0.0)	1(100.0)	1	212.00		
Total		61(25.3)	119(49.4)	61(25.3)	241			

Source: ***Primary data, (2024)***

The results in Table 9 reveal that most UTTs in all years of study had a moderate SES, although Year II students had a higher proportion 21(31.8%) with a high SES compared to other years. The mean rank for Year II (128.61) was significantly higher than Year I (103.47) and Year III (137.22), with a p-value of .004 (chi-square = 11.165), indicating that the year of study significantly influences SES. This implies that as students advance in their studies, their financial circumstances may improve, possibly due to increased experience or access to support. This aligns with UTAUT's concept that better-facilitating conditions (e.g., more access to resources) make EdTech adoption easier and more useful (Venkatesh et al., 2003).

Although there was no statistically significant variation in SES based on subject combinations (p = .149) and chi-square =18.232, some combinations such as BIO/CHEM, 13(48.1%), and GEO/ICT 4(36.4%) had relatively high SES. The mean rank for BIO/CHEM was 144.13, and for GEO/ICT was 122.45, while combinations like PHY/ICT (1(100%) high SES, mean rank = 207.50) and MAT/ECO (3(60%) moderate SES, mean rank = 128.80) had predominantly moderate SES levels. This variation implies that students from certain subject combinations may perceive more benefits from EdTech, in line with TAM's idea that individuals with higher SES perceive technology as more useful and easier to use, partly due to better access to resources(Davis, 1989; Lin & Yu, 2023).

A significant difference in SES was found between male and female UTTs (p = .014) with MWU = 5157.500. Female UTTs had a higher mean rank (136.72) compared to males (113.34), with more females 24(30.4%) reporting high SES compared to males 37(22.8%). This indicates that female UTTs might have slightly more financial stability, which provides better-facilitating conditions, allowing them to perceive EdTech as easier to use and more beneficial. According to UTAUT, such facilitating conditions can improve technology adoption (Venkatesh et al., 2003).

The type of sponsorship also influenced SES, though not statistically significant (p = .091) and WMU=1069.000, with privately sponsored UTTs showing a higher mean rank (122.81) compared to government-sponsored students (89.23). Privately sponsored students were more likely to have moderate SES 113(49.6%) and high SES 59(25.9%), while government-sponsored students showed lower SES levels, with 6(46.2%) reporting moderate SES and 5(38.5%) reporting low SES. This implies that government-sponsored UTTs may have fewer financial resources, limiting their access to EdTech. TAM's framework of perceived ease of use and UTAUT's emphasis on facilitating conditions suggest that financial constraints hinder the ability to engage with technology effectively (Davis, 1989; Venkatesh et al., 2003).

In terms of private sponsorship categories, UTTs sponsored by their fathers 68(52.7%) or receiving private scholarships 7(43.3%) were more likely to have moderate SES, with mean ranks of 110.54 and 148.98, respectively, though not statistically significant (p =.419), with chi-square = 4.973. This shows that financial backing from stable sources, like fathers or private scholarships, provides the necessary facilitating conditions to support higher SES and greater access to EdTech resources. Students sponsored by loan schemes or other relatives exhibited lower mean ranks and SES levels, reinforcing the TAM's idea that socioeconomic stability influences the perceived ease and usefulness of EdTech (Al-Oudat & Altamimi, 2022; Davis, 1989; Toros et al., 2024).

Age also significantly influenced SES (p = .029), with younger UTTs (20-24) having a higher SES mean rank (125.79) compared to older students (25-29, mean rank = 98.02), and chi-square = 9.055. Although older students may have more life experience, younger students appear to have better access to financial resources, possibly due to stronger family support. This aligns with TAM's idea that perceived ease of use and usefulness are influenced by available resources, which tend to be more accessible to younger students (Davis, 1989; Munabi et al., 2020).

The results reveal a relatively moderate SES across all demographic groups, aligning with qualitative findings where most UTTs reported having moderate SES. The analysis shows that SES, shaped by demographic factors like year of study, gender, age, and sponsorship, significantly influences UTTs' ability to engage with EdTech. The core ideas of TAM and UTAUT suggest that higher SES, which corresponds to better-facilitating conditions, enhances the perceived ease of use and usefulness of EdTech, making technology adoption easier for students with higher socioeconomic conditions. Thus, alternative hypothesis 2 (H_2), which posits that " *there is a statistically significant moderate level of UTTs' SES across demographic characteristics in EdTech adoption at Busitema University*," is partially accepted. These findings provide valuable insights into the specific needs and challenges faced by different UTT groups concerning their socioeconomic conditions and EdTech adoption.

Table 10: Shows Descriptive Statistics for a Sample of SES Entities

Entity	**No n(%)**	**Yes n(%)**	**Total n(%)**	Mean	Std. Deviation
I have enough money to buy data or internet bundles.	241 (100.0)	0(0.0)	241 (100.0)	.00	.00
I can pay for the license for the unlicensed e-books on the internet.	230(95.4)	11(4.6)	241 (100.0)	.05	.21
I do not have a smartphone.	222(92.1)	19(7.9)	241 (100.0)	.079	.27
I receive enough funds from home or other sources to support EdTech integration.	202(83.8)	39(16.2)	241 (100.0)	.16	.37
I have my laptop.	171(71.0)	70(29.0)	241 (100.0)	.29	.45
I have a very good smartphone.	136(56.4)	105(43.6)	241 (100.0)	.44	.50

Financial constraints make it difficult for me to participate in optional EdTech-related training programs or workshops.	92(38.2)	149(61.8)	241 (100.0)	.62	.49

Source: ***Primary data, (2024)***

Results in Table 9 reveal that all respondents (100.0%) reported not having enough money to buy data or internet bundles. These results align with qualitative findings where most UTTs complained of lacking enough money to buy data bundles for their EdTech activities such as Zoom or Google Meet lectures, and LMS access. UTT07 noted, *"I don't have enough money to buy data,*" another UTT (UTT08) stated, "*The high cost of data makes it difficult for me to attend online classes*," and another one (UTT20) mentioned, "*I often run out of data during important online sessions*."

The majority, 171 (71.0%), do not own a laptop, while 70 (29.0%) do. Qualitative findings supported this finding, with several UTTs stating, "*I can't afford a laptop*," and 11 others mentioning, "*Using public computers in cafes is inconvenient and limits our study time, and also sometimes expensive.*" Another UTT (UTT18) declared, "*Sharing my Uncle's laptop with him affects my study schedule*."

More than half of the respondents, 136 (56.4%), do not have a very good smartphone, and 105 (43.6%) have one. This was echoed in the qualitative data where UTT02 stated, "*My phone is old and slow, making it hard to access online learning materials and lectures*," while another (UTT05) said, "*A good smartphone is indeed essential in this context, but I can't afford one*."

A significant number of respondents, 222 (92.1%), have some form of smartphone, whereas 19 (7.9%) lack one. Further explanation from Qualitative findings revealed similar issues, with UTT06 mentioning, "*Having any smartphone helps, but a good one is crucial for effective learning*". Another (UTT10) said, "*Not having a smartphone at all makes it difficult for me to keep up with online classes."*

Most respondents, 230 (95.4%), cannot afford to pay for unlicensed e-books, with only 11 (4.6%) expressing feelings of being able to do so. This is corroborated by interview results

where UTT22 expressed heart-feeling difficulties, such as, "*Licensed e-books are too expensive for me*," and another (UTT07) noted, "*I rely on free or pirated versions, which are often incomplete or unreliable*."

A majority, 202 (83.8%), do not receive sufficient funds from home or other sources to support EdTech integration, while only 39 (16.2%) do. Qualitative findings supported this, with UTT20 mentioning, "*My family can't provide enough financial support for my educational needs, especially in the context of Technology integration,*" and another (UTT18) stating, "*I have to work part-time to afford some of these EdTech resources such as computer, data bundles.*"

Financial constraints make it difficult for 149 respondents (61.8%) to participate in optional EdTech-related training programs or workshops, whereas 92 (38.2%) do not face such constraints. This was reflected in the qualitative data, with UTT07 mentioning, " *I miss out on valuable EdTech workshops because I can't afford the fees,"* and another (UTT10) saying, "*EdTech Training programs organized outside the campus are too costly, even though they are beneficial for my studies*."

These findings collectively and elaborately describe UTTs' SES at Busitema University, implying that these UTTs may not be able to effectively adopt EdTech if the facilitating conditions such as their financial status or SES according to UTAUT model are worrying or low (Venkatesh et al., 2003).

Objective 3: To Assess the Differences in UTTs' Perceptions of the various Institutional Support they Receive in EdTech Integration at Busitema University.

Objective 3 was tested by analyzing the frequencies and percentages of the responses for the various individual items of institutional support as shown in Table 12.

Table 11: Institutional Support entities (n = 241)

Entity	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean	Std. Deviation	Mean Level
The university has developed a simple and operational LMS.	14(5.8)	16(6.6)	29(12.0)	125(51.9)	57(23.7)	3.81	1.06	High

The University modifies instructional or teaching methods to adopt EdTech.	21(8.7)	36(14.9)	59(24.5)	102(42.3)	23(9.5)	3.29	1.11	moderate
The university has allocated support staff to provide us with assistance during eLearning.	25(10.4)	47(19.5)	64(26.6)	70(29.0)	35(14.5)	3.18	1.21	moderate
The university lecturers give us adequate time to do assignments that require EdTech use.	30(12.4)	57(23.7)	38(15.8)	87(36.1)	29(12.9)	3.12	1.25	Moderate
The university has licensed e-learning resources such as Zoom, Turnitin, eBooks, etc.	43(17.8)	47(19.5)	38(15.8)	88(36.5)	25(10.4)	3.02	1.30	Moderate
The University revises or modifies the general education curriculum to suit the integration of EdTech.	30(12.4)	45(18.7)	74(30.7)	74(30.7)	18(7.5)	3.02	1.14	Moderate
The university often provides eLearning guidelines or policies.	30(12.4)	64(26.6)	53(22.0)	78(32.4)	16(6.6)	2.94	1.16	Moderate
The university provides adequate internet (Wi-Fi).	47(19.5)	56(23.2)	46(19.1)	73(30.3)	19(7.9)	2.84	1.27	Moderate
There is sufficient power or electricity at the university.	51(91.2)	64(26.6)	35(14.5)	69(98.6)	22(9.1)	2.78	1.31	Moderate
The university has a complete e-library.	59(24.5)	71(29.5)	37(15.4)	54(22.4)	20(8.3)	2.61	1.30	Moderate
The University gladly accepts and quickly responds to EdTech concerns.	79(32.8)	58(24.1)	55(22.8)	38(15.8)	11(4.6)	2.35	1.22	Low
The university provides us with adequate training on EdTech integration.	69(28.6)	85(35.3)	47(19.5)	34(14.1)	6(2.5)	2.27	1.10	Low
There are a sufficient number of projectors at the university.	97(40.2)	79(32.8)	30(12.4)	26(10.8)	9(3.7)	2.05	1.14	Low
There is an adequate number of computers in the lab or library.	93(38.6)	86(35.7)	28(11.6)	27(11.2)	7(2.9)	2.04	1.10	Low
There are enough speakers to amplify lectures.	122(50.6)	73(30.3)	29(12.0)	13(5.4)	4(1.7)	1.77	1.00	

Source: ***Primary data, (2024)***

The university has developed a simple and operational LMS, with 182 respondents (75.6%) agreeing or strongly agreeing, 29 (12.0%) remaining neutral, and only 30 (12.4%) disagreeing or strongly disagreeing (Mean = 3.81, SD = 1.06). This means that most UTTs find the LMS to be user-friendly and functional, agreeing with the UTAUT model (Venkatesh et al., 2003). Qualitative findings support this, with UTT56 stating, "*The LMS is user-friendly and accessible*," and UTT102 mentioning, "*We receive more support, such as technical assistance for LMS use from the cyber team and the university*." This implies that the university's efforts in providing an effective LMS have been well-received by the students.

Regarding the modification of instructional or teaching methods to adopt EdTech, 125 respondents (51.8%) agree or strongly agree, 59 (24.5%) are neutral, and 57 (23.6%) disagree or strongly disagree (Mean = 3.29, SD = 1.11). This indicates that a moderate number of UTTs feel that the university is making efforts to modify teaching methods to integrate EdTech. Qualitative findings confirm this with UTT21 noting, "*Some of our lecturers have adapted well to using technology, especially with Zoom or Google Meet or LMS use*," while UTT17 stated, "*Although most of our lecturers teach us both online and offline but some also need to adopt teaching methods to include EdTech."* This implies that while progress has been made, there is still a need for improvement in integrating EdTech into instructional methods.

The university's allocation of support staff to assist during eLearning received mixed responses, with 105 respondents (43.5%) agreeing or strongly agreeing, 64 (26.6%) remaining undecided, and 72 (29.9%) disagreeing or strongly disagreeing (Mean = 3.18, SD = 1.21). This shows that the availability of support staff is perceived as adequate by some UTTs but insufficient by others. Qualitative data supported this, with UTT01 noting, "*We need more assistance with technical issues*," and UTT11 stating, "*Although the university tries to support but support staff available is limited"*. This implies that the university may need to consider increasing the number of support staff to better meet the needs of the students, aligning with

the emphases laid by UTAUT on facilitating conditions and social influence (Venkatesh et al., 2003).

According to the time provided by lecturers for assignments requiring EdTech use, 87 respondents (36.1%) agreed or strongly agreed, 38 (15.8%) were neutral, while another 87 (36.1%) disagreed or strongly disagreed with the statement (Mean = 3.12, SD = 1.25). This indicates that opinions are divided on whether sufficient time is given for EdTech-based assignments. Qualitative responses reflect this, with some UTTs stating, "*Lecturers are understanding about the time needed for EdTech-based assignments*," while others mentioned, "*Deadlines are too tight given the tech challenges we face*". This implies that the university should consider a more flexible approach to assignment deadlines, especially when they involve EdTech.

The university's licensing of e-learning resources, such as Zoom, Turnitin, and eBooks, is another area of mixed perception. While 113 respondents (46.9%) agree or strongly agree, 38 (15.8%) are neutral, and 90 (37.3%) disagree or strongly disagree (Mean = 3.02, SD = 1.30). This shows that while some UTTs feel that the necessary resources are available, others disagree. Qualitative findings echoed this sentiment, with UTT03 mentioning, "*It's challenging to use free e-learning resources with limited features*," and another UTT09 stating, "*We don't have access to necessary e-learning tools such as Turnitin and eBooks*." This implies that the university needs to improve access to and licensing of essential e-learning tools to better support students.

Regarding the revision or modification of the general curriculum to suit EdTech integration, 92 respondents (38.2%) agreed or strongly agreed, 74 (30.7%) were neutral, while 75 (31.1%) disagreed or strongly disagreed (Mean = 3.02, SD = 1.14). This also indicates that there was a mixed perception among UTTs regarding the university's efforts to update the curriculum for better EdTech integration. Qualitative findings revealed similar concerns, with UTT83 mentioning, *"I think our curriculum is outdated and doesn't integrate enough*

technology," and another UTT11 stating, "*Courses such as Math units not uploaded on the LMS need to be uploaded to prepare us for the modern educational experiences*." This implies that the university may need to put more effort into revising the curriculum to better align with technological advancements.

On the provision of e-learning guidelines or policies, 94 respondents (39.0%) agreed or strongly agreed, 53 (22.0%) were undecided, while another 94 (39.0%) disagreed or strongly disagreed (Mean = 2.94, SD = 1.16). This shows that opinions were evenly split on whether the university provides adequate guidelines for e-learning. Qualitative findings indicated that, while some UTTs believed the EdTech guidelines are there for them to follow, with UTT100 noting, "*The university provides some instructions for e-learning, but I have only seen them in the library"*. Others felt unsatisfied, with UTT047 noting "*Guidelines are sometimes outdated or unclear."* This implies that the university should focus on improving and updating eLearning guidelines or developing a clear ICT integration policy to ensure they are clear and useful.

The university's provision of adequate internet (Wi-Fi) was met with a moderate response, with 92 respondents (38.2%) agreeing or strongly agreeing, 46 (19.1%) neutral, and 103 (42.7%) disagreeing or strongly disagreeing (Mean = 2.84, SD = 1.27). This suggests that many UTTs find the university's internet services to be inadequate. Qualitative data confirmed this finding, with several UTTs stating, "*The university Wi-Fi is often unreliable,"* and others saying, "*Sometimes the Wi-Fi is too slow to be useful*." This implies that the university needs to improve internet connectivity to better support students' learning activities, aligning with UTAUT's emphasis on ensuring good facilitating conditions to better adopt EdTech (Venkatesh et al., 2003).

Concerning the sufficiency of power or electricity at the university, 91 respondents (37.7%) agree or strongly agree, 35 (14.5%) are neutral, and 115 (47.7%) disagree or strongly disagree (Mean = 2.78, SD = 1.31). This indicates that a significant number of UTTs are

dissatisfied with the power supply at the university. Qualitative findings supported this, with UTT05 mentioning, "*Power outages disrupt our online lectures,"* and another UTT (UTT102) stating, "*The lack of consistent electricity makes it difficult to rely on digital tools.*" This implies that the university needs to address power supply issues to ensure a stable learning environment, agreeing with UTAUT (Venkatesh et al., 2003).

The completeness of the university's e-library is another area of concern. Only 74 respondents (30.7%) agree or strongly agree, 37 (15.4%) are neutral, and 130 (54.0%) disagree or strongly disagree (Mean = 2.61, SD = 1.30). This shows that many UTTs find the e-library to be lacking in essential materials. Interviews reflect this, with UTT105 highlighting, "*The e-library lacks essential materials. I always find difficulties while trying to locate important e-library resources for my assignment"* and another, UTT112 noting, "*We need more comprehensive resources in the university e-library to effectively complete our assignments*." This implies that the university should work on expanding and improving the resources available in its e-library.

The university's responsiveness to EdTech concerns is seen as low, with 49 respondents (20.3%) agreeing or strongly agreeing, 55 (22.8%) neutral, while 137 (56.8%) disagree or strongly disagree (Mean = 2.35, SD = 1.22). This suggests that many UTTs believe the university is slow to respond to their concerns related to EdTech. Qualitative findings corroborate this view, with one UTT noting, "*Our concerns are often ignored or addressed too slowly,*" and another stating, "*We need faster responses to our EdTech issues*." This implies that the university's responsiveness to EdTech concerns is seen as inadequate by many UTTs.

Results according to the adequacy of training on EdTech integration, 40 respondents (16.6%) agree or strongly agree, 47 (19.5%) are neutral, while 154 (63.9%) disagree or strongly disagree (Mean = 2.27, SD = 1.10). This indicates that most UTTs feel that the training provided by the university is insufficient. Qualitative findings reveal similar concerns, with UTT15 noting, "*We really need more comprehensive training sessions to effectively adopt*

EdTech," and other UTTs stating, "*The training provided is insufficient for our needs*." This implies that the university needs to enhance its training programs to better support students in integrating EdTech.

Regarding projectors, most respondents, 176 (73.0%) disagree or strongly disagree that there are sufficient projectors at the university, with only 35 (14.5%) agreeing or strongly agreeing, and 30 (12.4%) remaining neutral (Mean = 2.05, SD = 1.14). This shows that the university has a shortage of projectors, which may have negatively affected students' ability to present and engage with multimedia content. Qualitative findings confirm this, with most UTTs complaining about the limited number of projectors at the faculty. UTT104 mentioned, "*We always share only the two projectors in the computer department for all other departments,"* and another (UTT06) noted, "*The lack of projectors hinders our ability to present effectively*." This implies that the shortage of projectors is a significant issue that needs to be addressed.

Many respondents, 179 (74.3%), disagreed or strongly disagreed that there is an adequate number of computers in the lab or library, with only 34 (14.1%) agreeing or strongly agreeing, and 29 (12.0%) remaining neutral (Mean = 2.04, SD = 1.10). This indicates that there is a significant shortage of computers available to students, which hinders their ability to complete assignments and engage with digital tools. Qualitative responses confirm this, with UTT100 stating, "*There are very little or no working computers in the computer lab*" and another (UTT116) mentioning, "*There are less than five working computers in the library which are not even accessible, and there is in fact no proper computer lab at the campus*." This implies that the lack of computers is a major challenge for students.

A majority of respondents, 195 (80.9%), disagreed or strongly disagreed that there are enough speakers to amplify lectures, while only 17 (7.1%) agreed or strongly agreed, 29 (12.0%) were neutral (Mean = 1.77, SD = 0.97). This indicates that the lack of speakers is a major issue, as a significant majority of UTTs feel that the audio equipment available is

insufficient. Qualitative data confirm this, with UTT03 saying, *"It's hard to hear the lectures without the speakers in the conference hall," and another* (UTT07) stating, "*The lack of speakers affects our learning experience amidst the large numbers."* This implies that the inadequate number of speakers is detrimental to the learning environment.

Given the significant variation in responses across different support areas, it can be concluded that alternative hypothesis 2 (H_3) which states that "*There are statistically significant variations in UTTs' perceptions of the various institutional support they receive in EdTech integration at Busitema University"* was accepted.

Objective 4: The Moderation Effect of Institutional Support on the Relationship between UTTs' SES and their UTTs' Attitudes toward EdTech Adoption at Busitema University.

Bivariate Correlation analysis was carried out to establish the relationships between the variables, and the results are shown in Table 12.

Table 12: Correlation Coefficients (n = 241)

Variable		DV	IV	MV
UTTs' Attitudes toward EdTech adoption (DV)	*R*	1		
	P			
UTTs' SES (IV)	*R*	.363**	1	
	P	.000		
Institutional support (MV)	*R*	.361**	.055	1
	P	.000	.396	

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

From Table 13, results indicate a statistically significant moderately positive correlation between SES and UTTs' attitudes toward EdTech adoption (r = .363, p = .000). Thus, the alternative hypothesis (H_4) which states that "*there is a statistically significant positive correlation between UTTs' attitudes toward EdTech adoption at Busitema University" was accepted.*

The results also indicate a statistically significant moderately positive correlation between institutional support and UTTs' attitudes toward EdTech adoption (r = .361, p = .000). However, the very low positive correlation between SES and Institutional Support was not

statistically significant (r = .055, p = .396). This implies that an increase in UTTs' SES significantly increases attitudes toward EdTech adoption among UTTs. Similarly, an increase in institutional support fosters positive UTTs' attitudes toward EdTech adoption. These results agree with the UTAUT model that posits that facilitating conditions play a major role in fostering technology adoption (Venkatesh et al., 2003). However, the weak and non-significant correlation between UTTs' SES and institutional support shows that the level of support provided by the institution did not vary significantly with the SES of the students.

Objective 5: The Moderation Effect of Institutional Support on the Relationship between UTTs' SES and their UTTs' Attitudes toward EdTech Adoption at Busitema University.

Multiple regression analysis (using PROCESS v4.2 by Andrew Hayes) was also carried out to determine the influence of the UTTs' SES on attitudes toward EdTech adoption, and the moderation effect of institutional support on the UTTs' SES and their attitudes toward EdTech adoption, and the results are shown Table 14.

Table 13: Regression Analysis Model

Model 1	**Variable**	**R**	**R^2**	**MSE**	**F**	**df1**	**df2**	***P***
	Mean_EdT	.50	.25	.16	26.39	3.00	237.00	.00
	Interaction (X*W)	.00	.00		.72	1.00	237.00	.40
Model 2	**Variable**	**Coeff**	**Se**	**T**		**LLCI**	**ULCI**	***P***
	Constant	1.61	.50	3.23		.63	2.59	.00
	Mean_SES	.47	.21	2.19		.05	.89	.03
	Mean_IS	.41	.18	2.26		.05	.77	.02
	Int_1	-.07	.08	-.85		-.22	.09	.40

Level of confidence for all confidence intervals in output: 95.00

Results in Table 13 show that the overall model was statistically significant (F(3,237) = 26.39, R^2 = 0.25, p = .00), indicating a meaningful relationship between the predictor variables and the outcome variable (attitudes toward EdTech adoption). The model explained 25% of the

variance in the outcome (R^2 = .25), implying that the combination of predictors accounted for a significant portion of the variability in attitudes toward EdTech adoption.

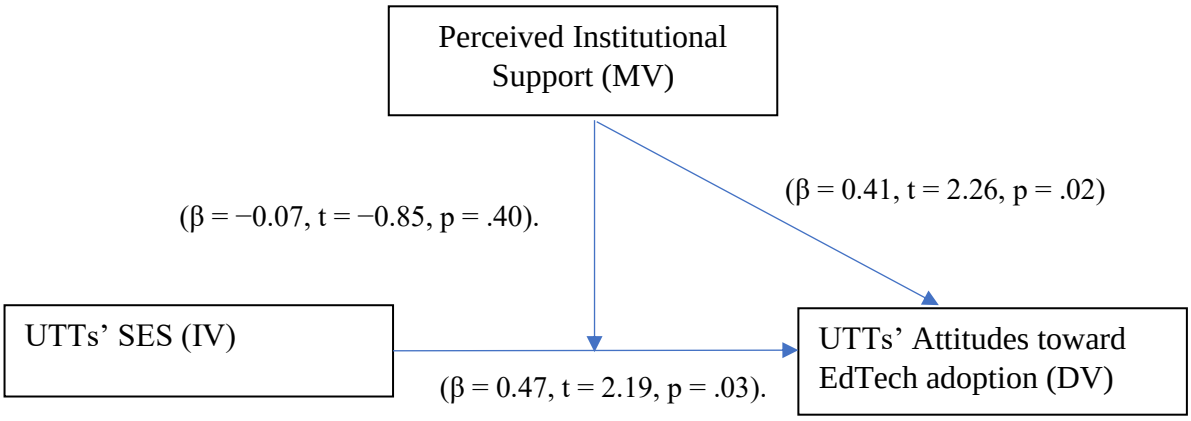

Figure 2: Moderation effect frame

Table 15 and Figure 2 shows that the regression coefficient for UTTs' SES was also statistically significant (β = 0.47, t = 2.19, p = .03). This means that for every unit increase in the students' SES, there was a 0.47 unit increase in their attitude towards EdTech adoption. The 95% confidence interval for this effect was between LLCI = 0.05 and ULCI = 0.89, implying that UTTs' SES increased their attitudes towards adopting EdTech from 5.0% to 89.0%.

Similarly, the regression coefficient for institutional support was significant (β = 0.41, t = 2.26, p = .02), indicating that every unit increase in institutional support was associated with a 0.41 unit increase in UTTs' attitudes towards EdTech adoption. The 95% confidence interval for this effect was between LLCI = 0.05 and ULCI = 0.77. This implies that institutional support for UTTs increased their attitudes towards EdTech adoption between 5.0% and 77.0%. These results are consistent with the two theories: TAM and UTAUT, which posit that the more favorable the facilitating conditions, the higher the technology adoption (Davis, 1989; Venkatesh et al., 2003).

However, the interaction term (SES x Institutional support) did not generate a statistically significant regression (β = −0.07, t = −0.85, p = .40). This means that institutional support did not significantly moderate the relationship between UTTs' SES and their attitudes towards EdTech adoption. Hence, the alternative hypothesis 4 (H_4), which states that "*There is*

a statistically significant moderation effect of institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University" was rejected. The 95% confidence interval for this effect was between LLCI = −0.22 and ULCI = 0.09. The R^2 change for the interaction term was 0.00 ($F(1,237) = 0.72$, $p = .40$), showing that adding the interaction term did not explain a significant amount of additional variance in attitudes towards EdTech adoption.

These findings imply that while both SES and institutional support independently predict the attitudes toward EdTech adoption among UTTs at Busitema University, their interaction does not significantly alter this relationship. This implies that UTTs' attitudes toward EdTech adoption are influenced separately by their SES and the level of support they receive from their institutions. Higher SES provides UTTs with the necessary resources and financial stability to adopt EdTech, promoting a positive attitude towards its use. Similarly, strong institutional support encourages UTTs to embrace EdTech by providing the necessary infrastructure, training, and encouragement, thereby fostering a conducive environment for positive attitudes toward EdTech adoption.

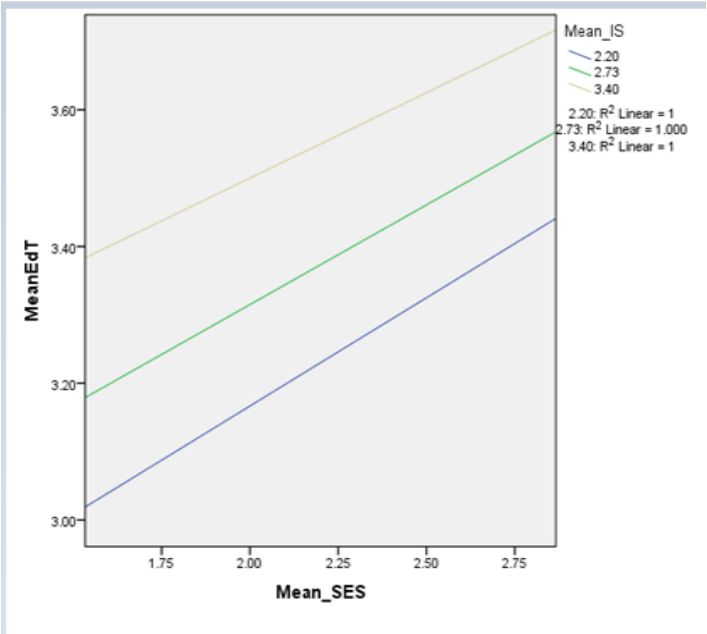

Figure 3: Moderation effect of Institutional support on the relationship between UTTs' SES and their Attitudes toward EdTech adoption.

Figure 3 further illustrates the moderation effect of institutional support (Mean_IS) on the relationship between the UTTs' SES (Mean_SES) and their Attitudes toward EdTech adoption (MeanEdT) at Busitema University. The graph shows a positive relationship between UTTs' SES and their attitudes toward EdTech adoption across different levels of Institutional Support. The parallel lines represent three levels of institutional support: 2.20, 2.73, and 3.40, which explains that as SES increases, attitudes toward EdTech adoption also improve. Specifically, for UTTs' SES ranging from 1.75 to 2.75, attitudes toward EdTech adoption range from approximately 3.00 to 3.65. This implies that when there is low institutional support, UTTs work harder to meet the needs of EdTech, demonstrating their resilience, resourcefulness, and problem-solving abilities.

Higher levels of institutional support correspond to higher attitudes toward EdTech adoption scores, with attitudes toward EdTech adoption values approximately at 3.00, 3.20, and 3.40 for institutional support values of 2.20, 2.73, and 3.40, respectively, when SES is low. The graph's parallel lines indicate that the effect of SES on EdTech attitudes does not vary significantly with institutional support levels, showing no significant interaction between SES and institutional support. This visualization supports the rejection of the alternative hypothesis (H_4), which posited a moderation effect of institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption.

Objective 6: Challenges UTTs Encounter in Adopting EdTech at Busitema University

The qualitative data from the open-ended questions reveals several specific challenges UTTs encounter in EdTech adoption at Busitema University as per objective 4 of this study. Several UTTs expressed significant difficulties with technical issues, infrastructure problems, and data accessibility. These challenges may have negatively affected UTTs abilities to effectively adopt EdTech, posing negative attitudes toward EdTech adoption.

The issue of unstable network connectivity has been a recurring theme, with many students reporting frequent disruptions during online lectures. Statements such as "*Poor*

network connectivity often makes it difficult to follow through with online classes" have been echoed by the majority of the respondents. This instability has led to frequent disconnections, causing frustration and hindering the learning process. UTT09 explained, "*The network drops multiple times during Zoom or Google sessions, making it hard to keep up with the lecture content or the lecture."*

Power supply problems have been another major challenge identified. UTTs have frequently cited unreliable electricity as a significant barrier. "*The power goes out frequently, which makes it difficult to attend online classes consistently*," UTT13 mentioned. These interruptions not only affect their ability to participate in live sessions but also disrupt their study schedules and assignment submissions. UTT16 shared, "*The inconsistent power supply makes me often miss online lectures."* Another one (UTT28) mentioned. "*I have failed to balance my night study schedules due to inconsistent power at Nagongera"*

Data accessibility and high costs also posed another significant obstacle. Many UTTs have highlighted the financial burden of purchasing data bundles necessary for online learning. The high cost of data has prevented students from accessing the LMS and other essential online resources consistently. UTT07 remarked, "*The expense of buying data regularly is overwhelming, moreover I have other financial responsibilities apart from data."*

In addition to data costs, limited knowledge and inadequate training on how to use EdTech tools have been significant issues. Many students have reported a lack of adequate training sessions and resources to help them navigate online platforms effectively. UTT01 remarked, *"Although LMS is easy to use, I sometimes find it difficult to use it because we haven't been taught how to use it properly."* This insufficient knowledge has resulted in the underutilization of available technological resources. Another student UTT63 added, "*The absence of proper guidance makes it hard to troubleshoot problems on my own*."

Equipment and gadget-related problems have further compounded these challenges. Students have pointed out that poor-quality gadgets and a lack of necessary devices have

hindered their ability to engage fully with EdTech. "*My phone often cannot handle the LMS, and it crashes frequently,*" UTT04 shared. The lack of access to reliable devices has left many students unable to participate in online learning adequately. UTT08 explained, "*The low quality of my phone makes me miss out on interactive features during lectures*."

Environmental and external factors have also negatively impacted the adoption of EdTech. Students have described harsh environmental conditions and external distractions that make it difficult to focus during online classes. "*The noise in my environment where I rent in Tissy makes it hard to concentrate on Zoom or Google Meet lectures,"* UTT05 stated.

Furthermore, some UTTs have to travel long distances to access free University Wi-Fi, adding to their challenges. UTT14 mentioned, *"I have to always walk between Tissy and campus to access the internet, which in most cases is weak."*

Engagement and interaction issues have been another major concern. Many UTTs have reported low levels of engagement and motivation due to insufficient one-on-one interaction. *"I miss the direct interaction with some of my lecturers and peers during my online lectures, which makes online learning less engaging,"* UTT20 expressed. This lack of engagement has led to feelings of isolation and decreased motivation to participate in online activities. UTT/13 shared, "*The virtual environment feels impersonal, which makes it hard to stay motivated."*

Security and privacy concerns have also been highlighted. Students have expressed worries about the security of their data on online platforms. "*I'm concerned about my privacy when using these online tools such as the LMS,*" UTT18 mentioned. These concerns may have deterred some students from fully embracing EdTech.

Finally, time management and scheduling issues have been significant barriers. Students have reportedly struggled with managing their time effectively, particularly with the demands of online learning. "*We are often given little time to complete assignments, especially on the LMS, which adds to our stress,*" UTT16 reported. Delays in scheduling and the late release of online activities by some lecturers have further exacerbated these time management

challenges. Another UTT (UTT30) mentioned, "*The unclear timetable makes it hard to balance my studies with other responsibilities.*"

Objective 7: Strategies UTTs Employ to Overcome the Challenges in the Integration of EdTech at Busitema University

The qualitative data findings have revealed that UTTs at Busitema University employ various strategies to mitigate the challenges they face in integrating technology into their studies. Many of them have resorted to using University Wi-Fi during early morning hours, and free internet supply Virtual Private Networks (VPNs) to ensure continuous connectivity and minimize data costs. UTT02 reported, "*I use a VPN to access more affordable data plans, which helps me stay connected for my lectures and Use of LMS*." UTT05 also shared her experience "*Connecting to the University Wi-Fi, especially behind the library in the early mornings, gives me a better chance at stable internet for attending to YouTube tutorials.*"

In response to frequent power interruptions, some UTTs have adopted power backup solutions. These include the use of power banks and solar to ensure they can continue participating in online classes without disruptions. UTT06 mentioned, "*I always keep a power bank charged to avoid missing out on lectures during power outages*." Another (UTT11) shared his experience, "*Having a mini solar at home has been a lifesaver during prolonged blackouts, allowing me to keep up with my studies*."

Another strategy has been leveraging the support of peers. Many students have reported borrowing gadgets and seeking assistance from friends who have better access to technology. "*When my device fails, I attend lectures using my friend's laptop*," UTT03 shared. Another one (UTT19) also revealed, "*I usually seek for assistance from computer science students when my laptop fails to connect to the internet however, sometimes they ask for something in return which bothers me a lot*". On the other hand, UTT08 revealed, "*Using my friend's laptop during critical times has helped me multiple times to meet deadlines for my assignments."*

Collaborating with peers has also extended to group data purchases and shared internet access,

allowing students to pool resources for better connectivity. UTT04 mentioned, "*We (3members) in our group usually contribute UGX. 1,000 each to buy 1.5GB Airtel data bundles and gather in one place to attend an online lecture using one laptop, which makes it cheaper*." Peer support and collaboration have also extended to academic assistance as well. UTTs have frequently consulted friends and lecturers for guidance on using digital platforms and completing assignments. "*I ask my friends and lecturers whenever I face challenges with the LMS,*" UTT12 stated. This willingness to seek help has facilitated smoother navigation of online learning tools such as LMS. Another (UTT25) highlighted, "*Discussing problems with classmates often leads to quick solutions that I wouldn't have figured out on my own.*" Additionally, "*Forming study groups where we can help each other with technical issues has been helpful,*" UTT29, a year II UTT remarked.

UTTs have also taken proactive measures by informing university management about the interruptions and issues they face although the responses are delayed. Raising complaints and seeking institutional support have been key strategies. "*We have reported the frequent network issues to the management, hoping they will improve the campus Wi-Fi,"* UTT10 noted. Another UTT (UTT07) highlighted, "*By voicing our concerns, we hope the administration will address the persistent power outages affecting our studies*."

Digital literacy and self-education have been significant strategies as well. Some UTTs have engaged in early preparations and sought YouTube tutorials to better understand and utilize the application software such as MATLAB, Chem draw, and video editing software. "*I download videos and prepare in advance to avoid any last-minute issues with Chem draw,*" Chemistry UTT (UTT11) explained. Continuous self-learning and familiarizing themselves with the platforms have enabled students to overcome initial difficulties. UTT07 said, "*I spend my free time learning new features of the LMS to stay ahead and avoid confusion during actual classes."* Furthermore, "*Watching YouTube tutorials on using Zoom and other tools has been incredibly helpful,"* said UTT15.

To cope with the financial burden of purchasing data, students have devised budgeting strategies. Reserving funds specifically for data and internet bundles at the start of the semester has been a common approach. "*I set aside money for data at the beginning of the semester to ensure I can attend all my online lectures,"* UTT35 shared. Additionally, some students have engaged their parents for financial support, securing loans to purchase essential devices like laptops and power banks. "*I convinced my parents to help me buy a second-hand laptop, which has made a huge difference,"* UTT10 remarked. UTT19 complemented, "*Saving money on less critical expenses to buy data has become a routine for me every month*."

Environmental strategies have included physically relocating to areas with better network reception. Climbing to higher ground or moving closer to Wi-Fi sources on campus have been effective solutions. UTT01 said, "*I often climb an anthill near my home to get a better signal for my online classes,*". This commitment to finding the best connectivity spots has helped students stay engaged in their studies. UTT09 explained, "*Walking to the campus library where the Wi-Fi is stronger ensures I don't miss any important online lectures*."

UTTs have also adopted flexible timing to manage network congestion. Attending online sessions such as using the LMS during off-peak hours, such as late at night, has helped them avoid slow and unreliable connections. "*I complete my coursework at night when the network is faster and less congested,*" UTT18 explained. UTT20 added, "*I prefer downloading lecture materials such as videos late at night when the internet speed is optimal*."

In general, UTTs at Busitema University have demonstrated resilience and resourcefulness in overcoming the numerous challenges associated with integrating EdTech. By employing a combination of technical, social, financial, and strategic measures, they have been able to navigate the complexities of online learning and make the most of available resources.

Chapter Five

Discussion, Conclusions, Recommendations, and Limitations

Overview of the Chapter

This chapter contains the discussion, conclusions, recommendations, and limitations of the study, as well as areas for further research based on the results in Chapter Four. The chapter starts with discussions of the results, organized according to the specific objectives, comparing with the existing literature and theoretical views. This is then followed by the conclusions derived from the discussions. Recommendations, limitations, and suggestions for further research are then derived from the conclusions.

Discussion of Findings

Demographic Characteristics Analysis

The descriptive statistics results show that the demographic characteristics consisted of a sample of 241 respondents with a diverse distribution across various categories (Table 5). The largest group of respondents were first-year students, with the smallest group being second-year students. The lower population in Year II could be attributed to them being an immediate post-COVID-19 class admitted from other years due to the unavailability of A-Level students for admission in 2022.

The numbers of respondents according to Subject combinations varied, with the MAT/CHEM combination having the highest population of UTTs, followed by Agriculture Double Main (AGRIC II MAIN), and the least being MAT/GEO. The large numbers of samples of CHEM/MATH and AGRIC II MAIN align with three-year admission records from the Academic Registrar's Office, where the number of UTTs admitted in those combinations has been consistently high. Although the enrolments of AGRIC II MAIN (100 students) weren't among the biggest numbers as other subject combinations such as MATH/COMP (125 students) and BIO/CHEM (113 students) in the recent admission for the academic year 2024/2025 were slightly higher than the AGRIC II MAIN, the numbers remain high.

CHEM/MATH is still in the lead in population with about 127 students enrolled in the recent admission for the academic year 2024/2025, according to the updates from the faculty AR's office. While, other combinations, such as MAT/GEO and PHY/COMP, have consistently had small numbers, even in the recent enrollment, where MAT/GEO has 09 students and PHY/COMP (23). However, the high enrollment in MAT/CHEM and AGRIC II MAIN disagrees with trends noted by who Ssempala and Masingila (2019) found that there was lower participation in science-related fields among teacher trainees. This discrepancy might be attributed to the specific educational context and institutional emphasis at Busitema University.

The results indicated that the majority of respondents were male UTTs, also agreeing with the faculty AR's records indicating that the majority of the UTTs in recent years are males. However, the finding does not agree with the newspaper report (2022) that the female student population exceeds that of the males in other universities, such as Makerere University, where female students were more than males (NewVision, 2022). These differences could have arisen from the differences in university preferences by the different genders, locations of universities, and courses offered, among others. Since Busitema University is more science-grounded as compared to Makerere, more male students predominantly enroll in its science courses (Lubaale, 2021). The results from Makerere were further validated by the Uganda Bureau of Statistics (UBOS) preliminary report 2024, where the Census 2024 results showed more females in Uganda than males with a notable margin, comprising 23.4 million females compared to 22.5 million males (UBOS, 2024).

The findings also revealed that most UTTs were privately sponsored, primarily by their fathers or mothers, with the predominant age group being 20-24 years, and minimal respondents aged 30-34 and 35-39. These results align with the study by Nshemereirwe (2016), who found that private sponsorship, especially by parents, was common among university students in Uganda, reflecting the socio-economic dynamics where families bear the educational costs due to limited government sponsorships. This also agrees with the findings of

Omona (2012) and Ssengendo (2012) who highlighted the ongoing challenges of public funding for higher education in Uganda.

The demographic skew towards younger age groups, particularly those aged 20-24, supports the findings of Nsubuga (2014) that most university students in Uganda fall within this age range. In another study, Owusu-Ansah (2016) reported that the majority of university students in Ghana fell within the 20-24 age range, emphasizing that this demographic trend is consistent across East and West Africa. However, this study's findings disagree with Milburga (2020), who noted a significant representation of older students, particularly in distance learning or in-service programs, where age groups 30-34 and 35-39 were more prevalent, demonstrating that age distribution in higher education can vary significantly based on program type and mode of delivery.

Mean Scores and Levels of the Study Variables

The descriptive statistics results revealed a moderate mean score for all three major variables: UTTs' SES, institutional support, and UTTs' attitudes toward EdTech adoption (Table 6). The moderate level of EdTech adoption implies that UTTs at Busitema University have a relatively positive attitude toward EdTech adoption at a moderate level. This means that while there is a general openness to adopting EdTech, there may still be some hesitancy or barriers that prevent full adoption (Kim et al., 2024). This finding agrees with Sharma and Srivastava (2020), who found that students appreciate the value of EdTech but are influenced by factors like ease of use and relevance, leading to moderate adoption levels. Buabeng-Andoh (2012) further revealed that perceived barriers, such as inadequate support and training, contribute to a cautious approach to EdTech adoption.

UTTs' SES also shows moderate mean scores, implying that the majority of UTTs at Busitema University come from households with relatively moderate socioeconomic backgrounds or have relatively moderate access to EdTech resources. This may mean that although these UTTs may have gained some access to EdTech resources or receive some

support, they still face difficulties in purchasing EdTech resources or may rely on external support to access necessary technologies. This agrees with the UNDP report (2022) and the arguments of scholars such as Nshemereirwe (2016), Owusu-Ansah (2016), and Milburga (2020), who have pointed out that given Uganda's status as a developing country, the majority of Ugandan university students, including UTTs, come from relatively low-income families, thereby hindering their access to essential EdTech resources. It also agrees with UTAUT's emphasis that facilitating conditions, including economic support, are critical for technology adoption (Venkatesh et al., 2003). The moderate SES score highlights a potential barrier to EdTech adoption, as financial constraints may limit UTTs' ability to fully engage with technological tools.

Similarly, the mean score for Institutional Support was moderate, indicating that UTTs receive a moderate level of institutional support for EdTech adoption. This finding shows that while there is some support from the institution, it may not be sufficient to fully encourage EdTech adoption among UTTs, reflecting the UTAUT model's emphasis on the importance of sufficient institutional support in facilitating technology adoption (Venkatesh et al., 2003). The findings agree with other findings of scholars such as Abenawe (2022) and Nshemereirwe (2016), who argued that institutional support for students in Uganda's educational institutions is often insufficient. The findings also align with findings from Olutola and Olatoye (2015), who noted that insufficient institutional support was one of the factors hindering effective EdTech integration in Nigerian universities.

Objective 1: UTTs' Attitude towards EdTech Adoption across Demographic Characteristics

The results revealed relatively moderately positive UTTs' attitudes toward EdTech adoption, as the majority of the respondents expressed moderately positive feelings toward EdTech adoption across the demographic characteristics of UTTs at Busitema University (Table 7). This rejects the alternative hypothesis (H_1) that "*There is a statistically significant*

moderate level of EdTech adoption across demographic characteristics of UTTs at Busitema University."

Across all years of study, most students showed moderate levels of EdTech adoption. However, the slight increase in EdTech adoption from Year I to Year III indicates that as UTTs gain more experience and exposure to EdTech, their adoption levels rise. This finding aligns with UTAUT, which emphasizes the role of facilitating conditions and experience in technology adoption (Venkatesh et al., 2003). TAM also highlights that perceived ease of use and perceived usefulness, which likely improve with experience, are critical factors in technology adoption (Davis, 1989), agreeing with the findings of this study. The findings also agree with the findings of a study by Mohamed and Hassan (2023), who noted that senior students at Mogadishu Secondary Schools exhibited higher EdTech adoption due to increased familiarity and proficiency with technology.

Most UTTs across different subject combinations exhibit moderate levels of EdTech adoption with a slight variation. Combinations like GEO/ICT and MAT/ECO showed slightly higher levels of EdTech adoption, implying that curriculum design inherently encourages more technology use. This is supported by the TAM model, which asserts that relevance to one's tasks enhances technology adoption (Enu-Kwesi & Opoku, 2020). The finding also agrees with the findings of another study conducted by Olutola and Olatoye (2015) on the Challenges of E-Learning Technologies in Nigerian University Education, which found that students in technology-intensive courses at Nigerian universities exhibited higher EdTech adoption rates due to curriculum demands. The findings of the study by Caldevilla-Domínguez et al. (2021) also demonstrated that subjects such as chemistry, physics, and ICT requiring digital literacy and extensive use of technological tools tend to have higher adoption rates among students.

Meanwhile, sex differences were evident, with male UTTs slightly more inclined towards higher adoption levels, although the majority of male and female respondents remain at moderate levels. Factors such as confidence with technology and resource access could be

influencing the slight difference. In their study, Bosch et al. (2023) observed similar trends in South African universities, where male students had more access to technological tools and support, leading to higher adoption rates. The study findings also agree with the findings of Subramaniam (2023) in Malaysia, who found that male students exhibited significantly higher EdTech adoption rates than their female counterparts, attributed to more consistent engagement with digital tools in their coursework.

It has also been found that privately sponsored students tend to show higher levels of attitudes toward EdTech adoption compared to government-sponsored peers, but the majority in both groups exhibit moderate adoption levels. These findings agree with the assertion made by Damani et al. (2022), stating that private sponsorship that provided students with better access to EdTech resources during the COVID-19-related school closures enhanced their adoption levels in rural parts of Uganda. UNESCO GEM Report (2023) further recommended that given the need to have equitable adoption of EdTech during critical situations like the COVID-19 outbreak, sufficient institutional support and subsidized access to technological resources could greatly help.

The majority of respondents across all age groups exhibit moderate levels of EdTech adoption, demonstrating that age is not a major determinant of adoption levels. However, these do not agree with the findings reported by Craig (2021) in China and the USA, where younger students demonstrated significantly higher levels of EdTech adoption due to their familiarity with technology from an early age. This implies a generational influence on technology adoption that is not as pronounced in the context of this study.

Objective 2: To Assess the Level of UTTs' SES across their Demographic Characteristics in Attitudes Formation towards EdTech Adoption at Busitema University.

Although descriptive statistics results revealed that while demographics such as year, sex, and age are statistically significant, other demographic characteristics are statistically significant SES of UTTs across different demographic characteristics, but the majority

consistently fell within moderate SES levels (Table 9). This observation partially supports the alternative hypothesis (H_2) that "*There is a statistically significant moderate level of UTTs' SES across demographic characteristics in EdTech adoption at Busitema University*."

Year II students showed a slightly higher proportion with high SES compared to those in Years I and III. However, the majority across all years remained within the moderate SES level. This implies that experience and progression in academic study do not significantly influence SES as initially hypothesized. These findings align partially with the UTAUT, which emphasizes that experience and facilitating conditions are important but may not solely determine students' SES (Venkatesh et al., 2003). The findings also agree with the findings of studies conducted by the American Psychological Association [APA] (2016) and Munir et al. (2023), which revealed that other factors beyond academic progression might play a role in SES, although these studies did not find the same consistency in moderate SES levels across academic years.

The findings according to subject combinations revealed also statistically significant variations in SES across the various subject combinations, with GEO/ICT and BIO/CHEM students reporting slightly higher SES levels. However, the majority of students across different subject combinations predominantly exhibited moderate SES levels. This implies that while curriculum design and the nature of specific subjects may support better financial planning and resource acquisition, these benefits are generally balanced, leading to a moderate SES across combinations, which agrees with TAM, emphasizing the relevance of tasks in enhancing technology adoption and financial stability (Alturki & Aldraiweesh, 2022).

The results indicate that both male and female UTTs predominantly reported moderate SES, with a slight tendency for higher SES among female students. These findings align with studies by Das et al. (2022) and UNDP (2022) which reported higher SES among female students due to specific support initiatives. However, this contrasts with Gebauer (2023) who

found no significant gender differences in SES, regardless of support programs, indicating that the moderate SES observed may result from more balanced access to resources across genders.

Analysis by type of sponsorship reveals that privately sponsored UTTs had higher SES levels compared to government-sponsored counterparts. However, even within these groups, the majority still fell within the moderate SES level, reflecting the overall consistency across the respondents. This finding highlights the impact of private financial support on SES, consistent with Muthoo and Mcgrenra (2013) and Omona (2012) who noted that privately sponsored students often receive more individualized support to enhance students' SES, which disagrees with UNDP (2022), who observed that government sponsorship provided sufficient financial stability in some contexts, leading to less variation in SES levels.

Following a similar trend, the specific source of private sponsorship plays a crucial role, with UTTs sponsored by fathers exhibiting slightly higher SES than others, although the majority in these groups still fell in a moderate SES level, indicating that the varying levels of financial and emotional support are provided by different sponsors. This supports the findings by Michubu (2013) and Nuseir (2020), who observed that different sources of sponsorship lead to varying levels of financial and emotional support, influencing students' SES. The moderate SES levels among those sponsored by other family members or loan schemes indicate that these sources provide consistent but moderate financial support.

Results also showed that younger UTTs (20-24) predominantly had a moderate SES, with a slight increase observed among older UTTs. This consistency across age groups implies that age is not a significant barrier to achieving a higher SES and that most UTTs, regardless of age, experience moderate SES levels. This finding is supported by Mocanu and Murariu (2021) and Rexroth et al. (2013), who also noted that age alone does not significantly influence SES but rather interacts with other demographic factors. The moderate SES levels across age groups mean that financial stability is influenced more by factors such as sponsorship and subject combination than by age alone.

The above discussion is further explained by discussing a sample of UTTs' SES measuring entities (Table 9), where more critical insights were gained into the obstacles facing UTTs, further validating the hypothesis (H_2) that "*there are statistically significant differences in the level of UTTs' SES across demographic characteristics amidst EdTech adoption at Busitema University.*"

Most UTTs reported lacking enough financial support to effectively adopt EdTech at the university. This agrees with the findings of a study conducted by Kisanga and Ireson (2015) on "*Barriers to eLearning Adoption in Tanzanian Universities*," where they found that financial constraints significantly hinder students' ability to access online educational resources. They further explained that many students struggled to afford data bundles and other essential digital tools, which directly impacted their participation in online learning activities (Daniel, 2020). Their findings also aligned with the qualitative findings of this study, where UTTs complained of lacking enough money to sustain daily data purchases for eLearning.

The majority of respondents reported not having a laptop, which is crucial for engaging with EdTech. This agrees with findings by Mc et al. (2023), who noted in their study *on "A Systematic Review of the Challenges of e-Learning Implementation in Sub-Saharan African Countries: 2016-2022*" that a lack of access to personal technological devices such as personal computers significantly limits students' ability to utilize online resources. They observed that students often had to rely on public computer facilities, which were frequently inadequate and inconvenient for extensive academic use. The importance of personal devices' ineffective EdTech adoption is also supported by the UTAUT model, which asserts that facilitating conditions are critical factors in technology adoption (Venkatesh et al., 2003).

A significant number of respondents reported lacking adequate smartphones, agreeing with the findings of a study conducted by Githinji et al. (2023) on "*Maneuvering through E-Learning Platforms: An Evaluation of Open Distance and E-Learning in Higher Education Institutions in Uganda*," which revealed that access to functional personal devices is crucial for

effective online learning. They highlighted that students with outdated or low-quality smartphones faced significant challenges in accessing and engaging with digital learning materials (Githinji et al., 2023; Owino, 2023). This finding is also supported by UTAUT, which emphasizes the role of facilitating conditions in the adoption of technology (Venkatesh et al., 2003).

Financial constraints were further evident, as most respondents could not afford to pay for licensed e-books. This is corroborated by qualitative data where students expressed difficulties in affording necessary digital learning resources. These challenges are echoed in the study by Chomunorwa and Mugobo (2023), on " *Challenges of e-learning adoption in South African public schools: Learners' perspectives,*" which reported that financial barriers significantly impact students' ability to purchase essential eLearning materials such as eBooks. In another similar study by Damani et al. (2022), it was revealed that limited financial resources were a major impediment to students' effective use of EdTech.

Likewise, most UTTs do not receive sufficient funds from home to support EdTech integration. This finding agrees with the World Bank Group (2023), which noted that students from financially disadvantaged backgrounds faced greater challenges in sustaining their educational needs, which affected their overall academic performance and engagement with technology.

Objective 3: Evaluation of the Extent of Support Provided by Busitema University for EdTech Adoption as Perceived by UTTs.

The evaluation of perceived institutional support for EdTech adoption at Busitema University reveals significant variability in the resources and support structures available to UTTs (Table 11). The findings indicate that while some areas, such as the implementation of LMS, show strong support, other critical areas like internet reliability, electricity, and access to e-learning resources are lacking. This supports the alternative hypothesis (H_3) "*There are*

statistically significant variations in UTTs' perceptions of the various institutional support they receive in EdTech integration at Busitema University".

Learning Management System (LMS).

There was positive feedback received on the university LMS indicating excellent support received by the UTTs. This could be attributed to the immense support offered by the recent Mastercard project through the cyber school Uganda to develop the University LMS. The finding aligns with the study by Mtani (2022) on "*Factors affecting Learning Management Systems Usage in Higher Learning Institutions in Tanzania: A Case of University of Dodoma",* who noted that experiencing pleasant feelings due to user-friendly and operational LMS significantly enhanced students' learning experiences. In a similar study in Nigeria, Yakubu et al. (2020) also highlighted a positive impact of well-implemented LMS systems from students in Nigerian universities, which disagrees with Bervell and Umar (2017) who reported significant challenges in LMS adoption in Trans-Saharan African countries such as Uganda due to poor infrastructure and inadequate training as compared to the western world.

Internet and Wi-Fi Access.

Most UTTs reported insufficient and unreliable internet access, with a substantial number disagreeing that the university provides adequate Wi-Fi. This finding aligns with Nthenya et al. (2021) in their study, *" Challenges and Issues of Online Education in Sub-Saharan Africa amid the Covid-19 Pandemic,"* which highlighted poor internet connectivity as a major barrier to effective online learning in the region. Similarly, the EdTech Hub (2023) emphasized the need for reliable internet infrastructure to support digital learning initiatives effectively. However, a study by Watermeyer et al. (2020) on " *COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration*" found that robust internet infrastructure was a key enabler of successful online learning, highlighting the disparity in technological readiness between different regions.

Electricity Supply

The inconsistency in electricity supply at Busitema University was another significant issue, with nearly half of the respondents expressing dissatisfaction. This is consistent with Johnson et al. (2016), who identified frequent power outages as a critical obstacle to the effective use of EdTech in the Sub-Saharan African region. This finding also agrees with the findings of study by Masue's (2020) study, on " *Applicability of E-learning in Higher Learning Institutions in Tanzania"* where they noted similar issues with power unreliability affecting e-learning implementation. However, Ramanujan and Chronicle (2024) found that despite similar infrastructural challenges, certain mitigation strategies, such as solar power, were partially effective in overcoming power-related barriers in rural learning centers in Ethiopia.

Licensed E-Learning Resources.

The mixed responses regarding the availability of licensed e-learning resources such as Zoom, Turnitin, and eBooks reflect a partial agreement with Acheampong (2023), " *An Exploratory Study on the COVID-19 E-learning on Students Academic Performance: The Case of the University of Ghana Business School*," which found that limited access to licensed software and resources hampers the adoption of e-learning tools. In another similar study, Tladi and Nleya (2017) highlighted the importance of access to comprehensive e-learning tools for enhancing educational outcomes. Bimenyimana et al. (2023) further confirmed this by asserting that widespread access to licensed e-learning tools significantly contributes to the successful adoption of digital learning practices.

Technical assistance.

The findings regarding technical assistance had also mixed reactions, with many UTTs feeling in need of more technical assistance. This agrees with the YouTube discussion by EdTech Hub (2023) on the necessity of continuous professional development and support for educators, where high emphasis was laid on ensuring adequate support staff to students and professional development in Universities to effectively integrate technology into their teaching

and learning practices. A study by Mtani (2022) on "*Factors Affecting Learning Management Systems Usage in Higher Learning Institutions in Tanzania: A Case of University of Dodoma,"* also laid a strong emphasis on the critical role of support staff in ensuring the effective use of LMS and other EdTech resources. A study by the World Bank Group (2023) further emphasized adequate support staff and professional development programs by noting their strength as key to the successful adoption of EdTech in several Western universities (in developed countries), highlighting a significant disparity in support levels.

Training on EdTech Integration

Most UTTs expressed a need for more adequate training on EdTech integration. This finding directly agrees with the EdTech Hub (2023) report, which highlights the critical role of continuous professional development in equipping educators with the necessary skills to utilize digital tools effectively. Eli-Chukwu, et al. (2023) further stressed the importance of faculty training in their study "C*hallenges of E-Learning in Higher Education Institutions in Nigeria."* However, findings from Alkalah (2023) in " *Toward a holistic approach to EdTech effectiveness*" indicated that well-structured training programs were successful in overcoming initial resistance and skill gaps, leading to effective EdTech integration.

Other Support Areas

The availability of projectors, speakers, and sufficient computers were areas where the university fell short, with many UTTs expressing dissatisfaction. These findings are in line with Eli-Chukwu, et al. (2023), who identified a lack of adequate technological infrastructure as a significant barrier to e-learning in higher education institutions in Nigeria. Similarly, in their on "*Revolutionizing education with AI: Exploring the transformative potential of ChatGPT"* Adiguzel et al. (2023) reportedly pointed out that reliable and easy-to-use technology solutions are vital for successful EdTech adoption.

Objective 4 and 5: Moderation Effect of Institutional Support on the Relationship between UTTs' SES and their Attitudes toward EdTech Adoption at Busitema University

The results presented in Table 13 in Chapter 4 provided critical insights into the relationship between UTTs' SES and their attitudes toward EdTech adoption (objective 4) and between institutional support, and attitudes toward EdTech adoption among UTTs at Busitema University. The findings indicated that both SES and institutional support are significantly independent predictors of UTTs' attitudes toward EdTech adoption, supporting the alternative hypothesis 4 (H_4) which states that there is *a statistically significant relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University*. The finding gave insights that higher SES and greater institutional support are directly linked to increased levels of EdTech usage among UTTs. However, the interaction term between SES and institutional support was not statistically significant, implying that institutional support does not have a significant moderation effect on the relationship between SES and UTTs' attitudes towards EdTech adoption. Consequently, Hypothesis 4 (H_4), and 5 (H_5), *which proposed a statistically significant moderation effect of institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption*, were rejected.

These findings agree with the UTAUT framework, which posits that facilitating conditions (such as institutional support) and personal factors (such as UTTs' SES) are crucial for EdTech adoption (Venkatesh et al., 2003). The findings also agree with the findings of Studies such as those by Wastiau et al. (2013) which reported that higher students' SES positively influences students' ability to adopt and effectively use technology, reinforcing the importance of SES as a predictor. Studies by Nicolai et al. (2023) further revealed that institutional support significantly enhances students' engagement with EdTech resources, supporting these findings and implying that institutional support is a critical factor in EdTech adoption.

However, the lack of a significant interaction between SES and institutional support challenges the expectation that institutional support would amplify the positive effects of SES on EdTech adoption. Alone (2017) and Buabeng-Andoh (2012) also echoed these findings asserting that institutional support alone is not sufficient to drive EdTech adoption without other factors, such as a supportive learning culture and individual readiness for technology use. In addition, Ifenthaler and Schweinbenz (2013) revealed that while institutional support is important, it needs to be complemented by personal initiative and peer influence to be effective, which may explain the lack of interaction effect found in this study.

However, the findings disagree with the findings of studies by Sharma and Srivastava (2020) who revealed that SES does not significantly impact EdTech adoption, with intrinsic motivation and personal attitudes toward technology being more influential. This divergence highlights the complexity of factors influencing EdTech adoption and shows that while SES and institutional support are important, they may not be the sole determinants, as these findings also imply.

Objective 6: Specific Challenges UTTs Encounter in Adopting EdTech at Busitema University

The qualitative data from open-ended questions parts of the Questionnaires highlighted several specific challenges, such as technical difficulties, infrastructure problems, and data accessibility challenges. Many UTTs reported significant problems with network stability, frequent disconnections during online lectures, and unreliable power supply. In addition to the above, UTTs reported to have faced high costs of data, inadequate training on EdTech tools, and equipment-related issues. Environmental factors, engagement issues, and security concerns further compounded these challenges.

The findings from this study align with several recent studies, both within Uganda and globally. A study conducted by Nansubuga and Okeya (2024) at Makerere University in Uganda highlighted similar issues where students struggled with unreliable internet

connections and frequent power outages, which hindered their online learning experiences. Another study at Kyambogo University found that high costs of internet data and inadequate ICT infrastructure were significant barriers to effective EdTech adoption (Lubaale, 2020). These challenges not only manifest themselves among University students in Uganda but also in other parts of the world. For example, research conducted by Ramafi (2022) in South Africa also reported similar findings. Students faced technical difficulties and high data costs, which exacerbated the digital divide in education. Another study in India emphasized the lack of adequate devices and proper digital literacy training as major obstacles to online learning (Sathiyamoorthy, 2023).

However, these findings disagree with the findings of other studies. For example, research conducted in South Africa found that students primarily faced challenges related to digital literacy and inadequate training rather than technical issues like network stability and power supply (Letlotlo, 2022). Another study by Unesco (2022) revealed that while students received proper training on EdTech tools in France, they struggled with issues such as data privacy and security. Furthermore, a study in Malaysia by Kamaruddin (2010) indicated that students faced challenges related to software compatibility and user interface design, differing from the hardware and connectivity issues reported at Busitema University.

These disagreeing findings underscore the importance of contextual factors in shaping the challenges associated with EdTech adoption. The specific challenges faced by UTTs at Busitema University, such as network and power supply problems, are reflective of broader infrastructural deficits that might not be as prevalent in more developed contexts. On the other hand, the psychological and social aspects of online learning, like motivation and engagement, may likely be more pronounced in settings where technical issues are less of a concern.

Objective 7: Specific Strategies UTTs Employ to Overcome the Challenges in the Integration of EdTech at Busitema University

Qualitative data findings revealed that UTTs at Busitema University have tried to develop a variety of strategies to mitigate the aforementioned challenges in objective 5, expressing their positive attitudes toward EdTech adoption through resilience, self-efficacy, social support, and problem-solving. Several UTTs reported using university Wi-Fi during early morning hours and using VPNs to ensure continuous connectivity and minimize data costs, showcasing their problem-solving abilities and resiliencies in finding effective solutions to technological barriers. The use of power backup solutions like power banks, small solar panels, and generators to cope with frequent power interruptions demonstrates adaptive coping mechanisms and resourcefulness.

Some of these findings agree with the findings of studies conducted by Edgar and Nhlayisi (2023), highlighting that students used strategies like using power banks to address power outages. A study by Mtebe and Raphael (2018) in Tanzania, also reported similar findings, that students used power banks to mitigate power outrage challenges and sought financial support from home to purchase necessary devices. This reflects the role of familial support and financial security in enabling students to navigate e-learning barriers which align with the findings of this study. A similar study conducted by Sombatruang et al. (2023) revealed that students with limited financial resources often utilize public Wi-Fi hotspots during off-pick hours to enhance internet connectivity and download large-volume files such as videos. Furthermore, a study by Pete (2019) in South Africa revealed that students frequently employed self-education strategies and budgeted for data expenses to manage the costs of online learning. This indicates a high level of self-regulation and intrinsic motivation among students, which are crucial for successful e-learning, thus agreeing with this study. However, the findings disagree with the findings of a study conducted by Mlitwa and Van Belle (2011) at the University of Cape Town on "*Mediators for Lecturer Perspectives on Learning*

Management Systems At Universities In The Western Cape, South Africa". Their findings revealed that students primarily utilized university-provided online resources and on-campus IT support to address technical issues, rather than relying on VPNs or power banks as in the case of Busitema University.

Peer support and collaboration have been crucial, with students borrowing gadgets, sharing data costs, and seeking assistance from friends, highlighting the importance of interpersonal relationships and community in overcoming challenges, and enhancing UTTs' self-efficacy (Mensah et al., 2024). A similar study by Mtebe and Raisamo (2014) in Tanzania also underscored the significance of peer support and collaboration among students in overcoming technological challenges, emphasizing the importance of social support in enhancing students' self-efficacy and motivation. However, a study in India" by Delavallade et al. (2019) found that students receive adequate university-led training programs and workshops to improve their digital literacy, reducing their reliance on peer support for navigating EdTech tools.

In addition to the above, UTTs have taken proactive measures through their guild leaders to inform university management about the issues they face, reflecting a sense of agency and advocacy. Environmental strategies, such as relocating to areas with better network reception and employing flexible timing to manage network congestion, demonstrate students' strategic thinking and adaptability.

UTTs have also Engaged in self-education through YouTube tutorials and adopting budgeting strategies for data expenses indicating high levels of self-regulation and intrinsic motivation. This disagrees with a study in " *Collaborative Learning: a Key To Enhance Students ' Social Interaction"* by Ghavifekr (2020) in Malaysia indicated that students collaborated with faculty members to develop personalized learning plans and received institutional support to acquire necessary gadgets, differing from the self-funded strategies

observed at Busitema University. These alternative strategies highlight the diverse approaches students adopt based on the resources and support available at their respective institutions.

Conclusions

The study has shown that UTTs' attitudes toward EdTech adoption at Busitema University are predominately moderate across demographic characteristics, with slight differences. Senior UTTs or finalists and those in technology-intensive courses exhibited slightly more positive attitudes, implying that advanced coursework and familiarity with technology influence perceptions. Gender disparities were also evident, with male students showing slightly more positive attitudes, possibly due to differences in interest and confidence in using technology. Similarly, privately sponsored students had slightly more favorable attitudes toward EdTech adoption, highlighting the role of financial resources in shaping perceptions of educational technologies. Financial stability allows students to procure necessary devices and internet access, which can positively impact their attitudes.

The study also found that demographic characteristics significantly influence UTTs' SES, which in turn affects their attitudes toward EdTech adoption. Female UTTs and those privately sponsored by fathers reported slightly higher SES levels, indicating the importance of gender and sponsorship sources. Higher SES also influenced the choice of subject combinations, with students from higher SES backgrounds more likely to select technology-integrated courses, further enhancing their positive attitudes.

Objectives 1 and 2: From the study findings, it can be concluded that demographic characteristics play a crucial role in UTTs' SES and influence their attitudes toward EdTech adoption. Therefore, demographic factors should be considered when designing strategies to improve attitudes toward EdTech adoption among UTTs at Busitema University. Efforts should ensure equitable access to educational technologies regardless of gender, sponsorship type, or SES. This could include financial aid for technology purchases, training to boost confidence in using EdTech and integrating EdTech across all courses.

Objective 3: Concerning institutional support for UTTs in EdTech adoption, the results indicate statistically significant variations among different entities. The implementation of the LMS was well-received, with many UTTs appreciating its usability and the structured access to course materials it provides. However, other areas, such as internet reliability and access to e-learning resources, need significant improvement. Frequent internet outages and limited availability of necessary e-learning tools have been highlighted as major barriers to effective EdTech adoption.

Objectives 4 and 5: While institutional support is recognized as a critical factor in facilitating EdTech adoption, the study found that it did not have a statistically significant moderation effect on the relationship between SES and EdTech adoption. This means that the influence of institutional support, when combined with SES, is less impactful than initially anticipated. It implies that even with strong institutional support, disparities in SES among UTTs still play a dominant role in their attitudes toward EdTech adoption. Therefore, addressing SES-related issues such as access to personal EdTech devices might be more effective in enhancing EdTech adoption than focusing solely on institutional support improvements.

Objective 6: These findings highlight the need for a more holistic approach to supporting EdTech adoption among UTTs at Busitema University. Improving internet infrastructure and ensuring reliable access to e-learning resources are essential steps. Additionally, efforts to mitigate SES disparities, such as providing financial aid for technology purchases and targeted support for lower SES students, could significantly enhance overall EdTech adoption rates. Apart from SES and institutional support influence on EdTech adoption, including technical difficulties, infrastructure issues, and financial constraints, various other issues such as unreliable internet connections, and frequent power outages, were significant barriers, underscoring the need for improved infrastructure and financial support to facilitate effective EdTech integration at Busitema University.

Objective 7: The study further revealed that UTTs have tried to employ various strategies to overcome the challenges in adopting EdTech. These strategies included using university Wi-Fi during off-peak hours, employing Virtual Private Networks (VPNs) for better connectivity, utilizing power banks and generators to counter power outages, and relying on peer support for sharing gadgets and data costs. UTTs additionally engaged in self-education through online tutorials and sought assistance from university management to address infrastructural issues. These adaptive strategies highlight the resilience and resourcefulness of UTTs in mitigating the barriers to EdTech adoption, fostering moderately positive attitudes toward EdTech adoption among them. Therefore, there's a need to support and encourage UTTs in employing those various strategies and also help them identify the most suitable strategies to employ to minimize the negative consequences of some of those strategies.

Recommendations

By implementing the following recommendations, the adoption of EdTech among UTTs at Busitema University could be significantly enhanced, leading to improved learning experiences and outcomes.

Enhance Financial Support for UTTs: By partnering with financial support entities to address the issues of inequalities in resources (objectives 1, 2, and 4). Busitema University should increase financial aid and private sponsorship opportunities such as offering loans for UTTs to enable them to acquire necessary technological resources. Financial support programs should be tailored to meet the diverse needs of students from different socioeconomic backgrounds, ensuring equitable access to EdTech tools.

Improve EdTech Infrastructure - (objectives 1, 2, and 3): The university needs to invest in reliable internet connectivity and stable electricity supply. Enhancing the technological infrastructure, including the provision of robust Wi-Fi networks and backup power solutions such as standby working or fully fueled generators, may help address the technical difficulties faced by UTTs, facilitating uninterrupted access to EdTech resources.

Gender-Sensitive Support Programs (objectives 1 and 3).: The University needs to develop and implement gender-sensitive support programs to address the disparities in EdTech adoption. These programs should focus on building confidence and providing equal opportunities for both male and female students to engage with technology. Targeted initiatives could include workshops, mentorship programs, and access to female role models in the EdTech field.

Proper training and Professional Development (objectives 1 and 3): Continuous professional development for both students and faculty is essential to maximize the potential of EdTech. The university needs to provide regular training and mentoring sessions on the integration and use of EdTech tools, ensuring that all stakeholders are well-equipped to utilize these resources effectively.

Encourage Peer Support and Collaboration (objectives 6 and 7): UTTs should be encouraged to continue with their peer support and collaboration. Creating platforms for students to share resources, experiences, and strategies can foster a supportive learning environment. Initiatives such as study groups, peer mentoring, and collaborative projects can enhance the collective adoption of EdTech.

Promote self-education by providing access to online tutorials and educational materials (objectives 6 and 7). The university should improve students' access to high-quality online resources that students can use to enhance their digital literacy and problem-solving skills independently. This could be done by organizing sensitization programs to guide the students.

Engagement with University Management (objectives 6 and 7): There is a need to establish clear channels for UTTs to communicate their challenges and needs to university management. Regular consultations and feedback sessions could help the administration to stay informed about the issues faced by students and to take timely action to address them.

There is also a need for clear ICT policy or Rules and Regulations (objectives 3, 6, and 7): Like other universities such as Makerere and Kyambogo, Busitema University needs to amend clear ICT rules and regulations for students to follow.

Limitations

I (the researcher) encountered several limitations during this study, which may have impacted the reliability and validity of the findings:

Limitations in the definitions of the key variables: Whereas, each variable in the study was conceptualized, the other dimensions that might have shaped them better were not considered. For instance, among EdTech adoption policy establishment was not considered as a key dimension in institutional support, and yet it plays a crucial role in determining students' attitudes toward EdTech adoption.

Limited Sample Size: The study considered a relatively small group of UTTs only from Busitema University, potentially limiting the representativeness of the results for UTTs and other groups of students in the university and across other universities in Uganda and beyond.

Generalizability Issues: The study's results are primarily relevant to UTTs at Busitema University and may not apply to other institutions or student populations in different regions or educational contexts.

Short-term Perspective: The research focused on short-term influences and experiences, not accounting for potential long-term outcomes of EdTech adoption. As data were collected at a single point in time, the findings might differ if observed over an extended period.

Cross-Sectional Design: The use of a cross-sectional survey design restricts the ability to draw causal inferences or compare outcomes over time. A longitudinal approach or an experimental study with a control group may have provided a more comprehensive understanding.

Measurement Difficulties of the variables: Assessing the UTTs' attitudes towards the adoption and effective use of EdTech, UTTs' SES, and institutional support was challenging

due to the subjective nature of variables and their varying definitions among students. What one UTT considered effective or good might differ from another's perception.

Researcher bias: The researcher's biases and assumptions could have influenced the study's design, data collection, analysis, and interpretation. Although efforts were made to minimize bias, it cannot be eliminated. Unintentional bias may have arisen.

Ethical Constraints: Adherence to ethical guidelines, such as obtaining informed consent, may have impacted the results, particularly among UTTs who were unable or unwilling to participate fully. This limitation could have introduced selection bias and affected the sample's representativeness.

Limitation in data collection tools: Due to the limited time frame, and also need to collect sufficient data from as many respondents as possible, Questionnaires containing both closed-ended and open-ended questions were used, which could also have their limitations in terms of flexibility. Other data collection tools such as interview guides and observations would also be used.

Areas for Further Research

The following areas for further study can be explored to deepen the understanding of the factors influencing EdTech adoption among UTTs at Busitema University and to enhance EdTech integration:

Long-term Effects of EdTech Adoption: Investigate the sustained impact of EdTech adoption on academic performance and professional development over time, tracking UTTs beyond their university education into their teaching careers.

Personalized EdTech Interventions: Develop and test tailored EdTech interventions based on individual student characteristics, learning styles, and needs to determine the most effective strategies for diverse UTT populations.

Technology-based Teaching Practices: Examine the efficacy of various technology-based teaching practices, such as flipped classrooms, blended learning, and interactive simulations, in improving educational outcomes for UTTs.

Cultural Adaptations of EdTech: Develop and test culturally sensitive EdTech tools and resources that are tailored to the local context and educational needs of UTTs in Uganda and similar regions.

Integration of EdTech with Traditional Methods: Explore the benefits and challenges of combining EdTech with traditional teaching methods, assessing the hybrid approach's impact on learning effectiveness and student engagement.

EdTech for Non-traditional Learners: Develop and test EdTech solutions designed for non-traditional learners, including part-time students, adult learners, and students with disabilities, to ensure inclusive access to technology-enhanced education.

Economic and Policy Implications of EdTech: Analyze the cost-effectiveness and policy implications of investing in EdTech infrastructure and training programs at universities, considering the broader economic impact on the education sector.

EdTech for Specific Educational Challenges: Develop and test EdTech solutions targeting specific educational challenges, such as language barriers, STEM education, and remote learning in underserved areas.

EdTech in Diverse Educational Contexts: Examine the effectiveness of EdTech in various educational settings, such as rural and urban schools, low-income communities, and different levels of the education system (primary, secondary, tertiary).

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Appendices

Appendix A:

Permission

BUSITEMA UNIVERSITY
Pursuing Excellence

www.busitema.ac.ug

OFFICE OF THE DEAN FACULTY OF SCIENCE AND EDUCATION

Date: 22nd April 2024

Your Ref:

Our Ref: BU/NAG/1001/1

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: Alihaj Salim Guma

The above named is a student of Busitema University pursuing a Master Degree in Educational Psychology (MEP) at Faculty of Science and Education (FSE).

In partial fulfilment for the award, he/she is conducting a research on Socioeconomic Status, Perceived Institutional Support, and Attitudes toward Educational Technology Adoption among Undergraduate Teacher Trainees at a Public University in Uganda.

The purpose of this letter is to formally request you to allow him/her collect data from your organization which is relevant to this research. This is purely an academic research and therefore any information collected will be treated with utmost confidentiality in accordance with the research ethics principles.

Any assistance accorded to him/her in this regard will highly be appreciated.

Thank you.

Sincerely,

Associate Professor David Kani Olema
FACULTY DEAN

Appendix B:

Data Collection Instructions: Structured Questionnaire for UTTs

BUSITEMA UNIVERSITY
Pursuing Excellence

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FACULTY OF SCIENCE AND EDUCATION

DEPARTMENT OF EDUCATION

MASTER OF EDUCATIONAL PSYCHOLOGY (MEP)

Questionnaire

Dear Participant,

My name is Alihaj Salim Guma, a student at Busitema University. I kindly invite you to participate in my study titled "***Institutional support, Socioeconomic Status (SES), and Educational technology (EdTech) Adoption among Undergraduate Teacher Trainees (UTTs) at Busitema University"*** in partial fulfillment of the requirements for the award of the degree of Master of Educational Psychology (MEP). You have been selected as a participant owing to your eligibility as a UTT. Your participation in the study is completely voluntary, and your responses will be treated with high integrity and confidentiality. Data from the study will ONLY be used for the purpose of this study and will be reported collectively NOT as individual data. The findings of the study will be used to create awareness about your experiences in this context, which will consequently help to improve the current situation.

The questionnaire is simple to answer and you are free to take as much time as possible to answer all the questions.

Please answer the following questions by either writing or ticking (✔) the most appropriate statement that suits you.

Feel free and take your time as you present or give your responses.

DO NOT write your name and registration number anywhere on this questionnaire.

SECTION A: Demographics

In this Section, fill in your required details in the corresponding dashes	
1. Year/Class (e.g. I, II)	……
2. Subject Combination (e.g. Math/Comp)	……
3. Sex (Male or Female)	……
4. Sponsorship (Private or Government)	……
5. If privately sponsored, who is particularly responsible for your tuition (e.g. Father, Mother, Uncle, Organization, Loan …)	……
6. Age (e.g. 23)	……

SECTION B: OBJECTIVES:

A. Undergraduate Teacher Trainees' (UTTs') Socioeconomic Status (SES).

Part I: Family or Household SES.

In this section, tick **(✔)** the right-hand side box**,** against the most appropriate alternative that accurately describes the social and economic status of your family. Describe the family honestly as you generally see it now, not as you wish it to be in the future, in relation to families in your neighborhood.

Q1. How much money does your family earn in a month from all sources/members?						
1	Greater than 1,500,000.			5	200,000 – 399,999.	
2	1,000,000 – 1,499,999.			6	100,000 – 199,999.	
3	600,000 – 999,999.			7	50,000 – 99,999.	
4	400,000 – 599,999.			8	Less than 50,000.	
Q2. What is Education level of the head of your family?						
1	PhD.			6	S6 Certificate.	
2	Master's degree.			7	S4 Certificate.	
3	Bachelor's Degree.			8	P7.	
4	Diploma.			9	Primary but below P7.	
5	College Certificate.			10	Never went to school.	
Q3. What is the occupation of the head of the family?						
1	Government employee.			3	Private employee.	
2	Self-employed.			4	Casually employed.	
5	None of the family members is employed.					
Q4. Make a tick on the possessions that your family has.						
1	Refrigerator.			6	Farm.	
2	TV.			7	Mobile Telephone.	
3	Radio/Music system.			8	Bank account(s).	
4	Air Conditioner.			9	VIP latrine.	
5	Washing Machine.					
Q5. What type of house(s) does your family have?						
1.	Own house with 5 or more rooms.			5.	Rented/Govt. house with 3-4 rooms.	

2.	Own house with 3-4 rooms.			6.	Rented/Govt. house with 1-2.	
3.	Rented/Govt. house with 5 or more rooms.			7.	Own mud and wattle house.	
4.	Own house with 1-2 rooms.			8.	Rented mud and wattle house.	
Q6. Possession of a vehicle or equivalent.						
1.	2 or more car/Tractors/Trucks.			4.	1 or more bicycles (not baby cycle).	
2.	1 Car /Tractor/Truck.			5.	None of the above.	
3.	1 or more motorcycle(s).					
Q7. Number of earning members in the family (Nuclear/extended).						
1	3 or more members earning and income brought together.			3	Only 1 family member earning.	
2	2 or both husband and wife earning.			4	No earning member.	
Q8. Number of children in the family. How many children are you in your family?						
1	0 – 2.			4	9 – 11.	
2	3 - 5.			5	12 – 14.	
3	6 - 8.			6	>15.	
Q9. Does your family have both tap water and electricity?						
1.	Yes, both tap water supply and electricity.			2.	Yes, only one of the above two is present.	
3.	No, none is present.					
Q10. Education of children (in relation to head of the family) **Note: Exclude under 5 children for this item. A child applicable here is one who is 5 years or above.**						
1	All children going/ever gone to school/college.			3	Less than 50% children ever gone/going to school/college.	
2	Greater than 50% children ever gone/going to school/college.			4	No child ever gone/going to school/college.	
Q 11. Employment of a domestic servant at home.						
1.	Employed more than two full time servants on salary for domestic work.			4.	Employed more than three 3 part time servants on salary for domestic work.	
2.	Employed only one full time servant on salary for domestic work.			5.	Employed one to two part time servants on salary for domestic work.	
3.	Employed no servants for domestic work.					
Q 12. Type of locality the family is residing.						
1.	Living in town.			2.	Living in the village.	
Q. 13. Members of family gone abroad in last three years (official or personal)						
1	Whole family.			3	Only 1 family member.	
2	Only husband and wife.			4	None.	

SECTION B: OBJECTIVES (CONT...)

Tick (✔) the appropriate number following the corresponding meaning as below.

1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree

S/N	Statement(s)	0 - No				1 – Yes
A. UNDERGRADUATE TEACHER TRAINEES' (UTTS') SOCIOECONOMIC STATUS (SES). **PART II: UTT'S ACCESSIBILITY TO EDTECH RESOURCES.**						
1	I have enough money to buy data or internet bundles.	0				1
2	I have my own laptop.	0				1
3	I have a very good smartphone.	0				1
4	I totally do not have a smartphone.	0				1
5	I can pay the license for the unlicensed e-books on internet.	0				1
6	I receive enough funds from home or other sources to support EdTech integration.	0				1
7	Financial constraints make it difficult for me to participate in optional EdTech-related training programs or workshops.	0				1
B. ATTITUDE TOWARDS EDUCATIONAL TECHNOLOGY (EdTech) ADOPTION.						
	i) **Participation and engagement.**					
1	I often use the e-library instead of the physical library.	1	2	3	4	5
2	I always attend zoom or google meet lecture.	1	2	3	4	5
3	I frequently access and use the LMS.	1	2	3	4	5
4	I always use computers to do my course works.	1	2	3	4	5
5	We often use online discussion forums to do our discussions.	1	2	3	4	5
	ii)**Familiarity with EdTech.**					
6	I'm familiar with searching for the right information in doing my assignments.	1	2	3	4	5
7	I can navigate the University LMS without assistance.	1	2	3	4	5
8	I'm able to make citations using software such as Mendeley and Endnote.	1	2	3	4	5
9	I'm familiar with using smartphones and tablets in attending zoom and google meet lectures.	1	2	3	4	5
10	I can ably use audio and video equipment.	1	2	3	4	5
11	I do not face challenges with using laptop or computer.	1	2	3	4	5
	iii) **The EdTech tools' usage in education is obstructed by…**					
12	…costs of different EdTech tools.	1	2	3	4	5
13	…uncertainties related to the different EdTech tools' quality.	1	2	3	4	5
14	…too much time spend for learning to use it.	1	2	3	4	5
15	…lack of awareness of intellectual property.	1	2	3	4	5
16	…lack of proper EdTech competence.	1	2	3	4	5
	iv) **Feelings regarding EdTech tools usage.**					
17	Working with EdTech tools makes me nervous.	1	2	3	4	5
18	EdTech tools give me an unpleasant feeling.	1	2	3	4	5
19	EdTech tools make me feel uncomfortable.	1	2	3	4	5
20	I feel relaxed when I use digital resources.	1	2	3	4	5
	v) **Perceived ease of use of EdTech tools.**					
21	I find EdTech tools to be easy to use from anywhere.	1	2	3	4	5
22	Using any EdTech tools is clear and logical.	1	2	3	4	5
23	EdTech tools provide flexibility in interaction with the user.	1	2	3	4	5
24	I could easily acquire useful skills needed to use any digital tools.	1	2	3	4	5
25	I find EdTech tools to be easy to use anytime.	1	2	3	4	5

26	I can use any EdTech tools without problems if I have support.	1	2	3	4	5
27	I am sure I can use any EdTech educational resource without technical guidance.	1	2	3	4	5
28	I need user instructions for any digital resource.	1	2	3	4	5
29	I need help from friends to use any digital resources.	1	2	3	4	5
	vi) **Perceived usefulness of EdTech tools usage.**					
30	EdTech tools use can improve my knowledge exchange.	1	2	3	4	5
31	EdTech tools use can enhance self-education.	1	2	3	4	5
32	EdTech tools use would allow me to complete homework more quickly.	1	2	3	4	5
33	EdTech tools use can increase my learning performance.	1	2	3	4	5
34	EdTech tools use can increase my learning efficiency.	1	2	3	4	5
	vii) Intention to use EdTech tools.					
35	Assuming I have permission to use, I will use different EdTech tools.	1	2	3	4	5
36	I will use different EdTech tools to search for data, if necessary.	1	2	3	4	5
37	I intend to use different EdTech tools, but after I documented.	1	2	3	4	5
	C. **INSTITUTIONAL SUPPORT FOR UTTS IN EDUCATIONAL TECHNOLOGY INTEGRATION**					
1	The university provides adequate internet (Wi-Fi).	1	2	3	4	5
2	There is sufficient power or electricity at the university.	1	2	3	4	5
3	The university has licensed the e-learning resources such as zoom, Turnitin, eBooks etc.	1	2	3	4	5
4	The university has developed simple and operational LMS.	1	2	3	4	5
5	The university has allocated us support staff to provide us assistance during eLearning.	1	2	3	4	5
6	The university lecturers give us adequate time to do assignments that require EdTech use.	1	2	3	4	5
7	The university has a complete e-library.	1	2	3	4	5
8	The university often provides eLearning guidelines or policies.	1	2	3	4	5
9	There is an adequate number of computers in the lab or library.	1	2	3	4	5
10	The university provides us with adequate training on EdTech integration.	1	2	3	4	5
11	There are sufficient number projectors at the university.	1	2	3	4	5
12	There are enough speakers to amplify lectures.	1	2	3	4	5
13	The University gladly accepts and quickly responds to EdTech concerns.	1	2	3	4	5
14	The University revises or modifies general education curriculum to suit the integration of EdTech.	1	2	3	4	5
15	The University modifies instructional or teaching methods to adopt EdTech.	1	2	3	4	5

Adopted from Lazar et al. (2020)**,** Abenawe (2017), Nshemereirwe (2016b)**,** Peterson et al. 1999)

D. OPEN-ENDED QUESTIONS: CHALLLENGES AND STRATEGIES

In this Section, write as many answers as possible depending on your personal experience.

1. What challenges do you face in carrying out Educational Technology (EdTech) activities like LMS activities or use of LMS, Zoom or google lectures, doing assignments or course works Using computers and other gadgets etc? **You can write as many challenges as possible in the spaced provided below.**

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2. How do you usually overcome the challenges you mentioned in (1) above? **(to cure or solve the challenges in hand)**

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3. What other strategies do you usually employ in successfully carrying out EdTech activities (such as LMS activities, Zoom or google lectures, doing assignments or course works), that prevent you from facing the challenges mentioned in (1) above? **(Preventive or to minimize the chance of facing challenges).**

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Thank you for your participation.

Appendix C:

Krejcie and Morgan (1970) sample determination

Table for Determining Sample Size from a Given Population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368

Krejcie and Morgan (1970) sample determination table. Source: Krejcie and Morgan (1970)

Appendix D:

Summary of Data Analysis process by objective

SNO.	Objective	Data Analysis process
1.	To examine the level of UTTs' attitudes toward EdTech Adoption across demographic characteristics among UTTs at Busitema University.	Crosstabulation descriptive statistics was performed for Levels of EdTech adoption across demographic characteristics. The analysis was carried out as follows: Analyze > Descriptive Statistics > Crosstabs > Demographics and EdTech Level were moved to Rows and Columns respectively, and ok was selected to proceed. Consequently, seven tables containing results were generated and transferred to the word document for compilation to represent results for objective 1 in one table. Mann-Whitney U and Kruskal-Wallis Tests were also carried out to determine whether relationships between the demographics and the variable are significant or not, and also to determine the differences across the demographics. The analysis was done as follows: Analysis > Nonparametric Tests > Legacy Dialogs > Select either 2 independents samples (for two groups) or K independent samples (for more 2 groups). Group such 1 and 2, and minimum and maximum values are then assigned for the demographics for 2 independents samples and K independent samples respectively. Then OK was selected to generate the outcomes which were compiled for interpretation.

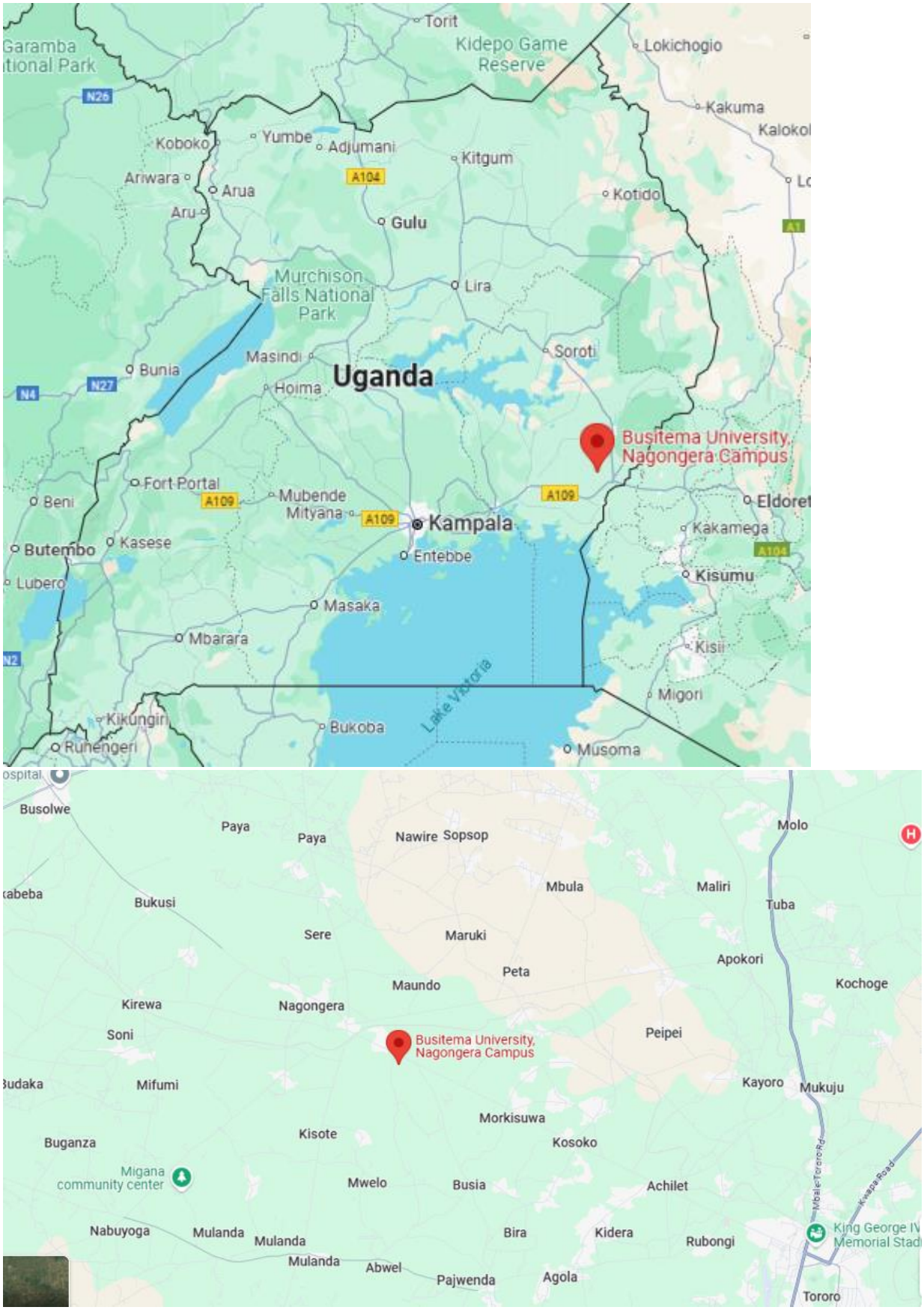
2.	To assess the level of UTTs' SES across their demographic characteristics in attitudes formation toward EdTech adoption at Busitema University.	The same analysis process in objective 1 was also used for this objective. However, further analysis was done to check variations in sample of SES entities. This was done by evaluating their frequencies and percentages of the ratings: Strong Disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The following procedure was followed: Analyze >Descriptive statistics > frequencies > dragging required entities into the variable(s) > then select such as bar graph from charts and click "OK" to produce results. The results obtained were also compared or confirmed by the qualitative data from open-ended questions during interpretation and discussion to gain more insights.
3.	To assess the differences in UTTs' perceptions on the various institutional support receive they in EdTech integration.	Descriptive Statistics Analysis was carried out using frequencies, percentages, means and standard deviation. Analysis followed this: Analyze > Descriptive Statistics > Frequency and institutional support were then dragged into the box. With mean, and standard included from the statistics, several tables containing the results were generated which were later compiled to produce one for easy data interpretation.

4 &5.	4. To assess the relationship between UTT's SES and their attitudes toward EdTech adoption at Busitema University. 5. To evaluate the moderation effect of perceived Institutional support on the relationship between UTTs' SES and their attitudes toward EdTech adoption at Busitema University.	Correlation analysis and Multiple linear regression analysis were carried out. Pearson Correlation coefficients were obtained by following the following procedure: Analyze > Correlate > Bivariate > then the means of three main variables (Mean of SES, Mean of Institutional support and Mean of Attitudes toward EdTech adoption were dragged into the variable(s) box > Pearson and Two tailed selected and then okayed to obtain results. Then analysis moderation effect analysis was carried out using PROCCESS v4.2 by Andrew Hayes. Analyze > Regression > PROCCESS v4.2 by Andrew Hayes > then drag DV (Mean EdTech Adoption) to Y-variable, IV(SES) to X-variable and MI (Institutional support) to Moderator variable Z was the procedure followed. Then the various tables including ANOVA, moderation effect model were generated, which were then extracted, copied and pasted in word document for interpretation.
6.	To explore the challenges UTTs encounter in adopting EdTech at Busitema University.	Data transcription was first carried out where data was arranged in themes (Major challenges), subthemes (sub challenges), and analyzed following patterns were formed.
7.	To explore the strategies UTTs employ to overcome the challenges they encounter in adopting EdTech at Busitema University.	Done following the same procedure in objective 5.

Appendix E:

Geographic Location

Map of Uganda Showing Busitema University Nagongera Campus



Appendix F:

Similarity index