ICT READINESS IN UGANDAN TEACHER TRAINING INSTITUTIONS: A CASE STUDY OF MAKERERE UNIVERSITY

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A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF EDUCATION AND EXTERNAL STUDIES (CEES) IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELORS' DEGREE IN EDUCATION OF MAKERERE UNIVERSITY, KAMPALA.

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DECLARATION

We declare that the research report titled "**ICT Readiness in Ugandan Teacher Training Institutions: A Case Study of Makerere University**." is our original work and has not been presented for any award at any higher institution of education.

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APPROVAL

I hereby approve that the research report titled "**ICT Readiness in Ugandan Teacher Training Institutions: A Case Study of Makerere University**" has been under my supervision. It is hereby submitted for examination with approval of the supervisor whose signature is appended hereunder.

DR. HENRY AMPEIRE KARIISA

Signature: ..... Date: 7th - September - 2025

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AI	Artificial Intelligence
ICT	Information and Communication Technology

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ABSTRACT

Information and Communication Technology (ICT) is now central to the delivery of quality education across the world. This study adopted a quantitative cross-sectional design to assess ICT readiness in Ugandan teacher training institutions, using Makerere University as a case study. The main objectives were to examine the availability and quality of ICT infrastructure, explore socioeconomic factors affecting ICT use, and analyse gender differences in ICT readiness among teacher trainees. Data were collected from 103 respondents through structured questionnaires and analysed using descriptive and inferential statistics, SPSS version 25 was used for analysis. The findings revealed that 38.8% of respondents disagreed that computer labs were accessible when needed, and 52.4% reported inadequate ICT support staff, highlighting major infrastructural gaps. However, 40.8% strongly agreed that internet connectivity was reliable, and 42.7% agreed that digital resources were adequate, showing progress in some areas. Socioeconomic barriers were prominent, with 44.7% strongly agreeing that limited funding hindered readiness and 38.8% agreeing that lack of computer literacy skills was a challenge. In contrast, 47.6% disagreed that peer pressure influenced ICT use, and 43.7% strongly agreed that personal decisions and beliefs shaped their readiness. Male trainees recorded a slightly higher mean readiness score ($M = 20.68$, $SD = 3.91$) than females ($M = 19.72$, $SD = 2.37$), though the difference was not statistically significant ($p = .137$). The study concluded that ICT readiness at Makerere University is shaped more by structural and socioeconomic constraints than by gender disparities. It recommends increased investment in ICT infrastructure, expanded technical support, targeted policy reforms, stronger modelling of ICT use by teacher educators, and personal commitment by trainees to develop digital skills.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter presents the background, the statement of the problem, objectives of the study, research questions, scope, significance, justification, and conceptual framework of the study.

1.1 Background of the study

Information and Communication Technology (ICT) has become an essential component of education, influencing teaching, learning, and institutional management. Its integration provides opportunities for wider access to knowledge, interactive learning, and the development of digital skills that are vital in the 21st century (Elmi et al., 2024). Teacher training institutions are particularly important in this transformation because they prepare educators who will implement ICT in schools. However, the effectiveness of ICT integration depends on the readiness of these institutions in terms of infrastructure, technical skills, and policy support (Frank and Adeyemi Ayomide, 2024). Without adequate readiness, teacher trainees may graduate without the competencies needed to integrate digital tools into their future classrooms, which weakens the overall education system.

Globally, countries have taken diverse approaches to enhancing ICT readiness in teacher training institutions. In Mongolia, a national survey involving 1,917 secondary school teachers revealed varying levels of ICT application competence, classroom use, and support for inclusive education, highlighting both strengths and critical gaps in ICT infrastructure and skills training (Tsedevsuren Danzan et al., 2025). In Italy, researchers applied a multidimensional framework to assess teachers' readiness for ICT integration, revealing significant differences across regions and pointing to the necessity of targeted policies to support digital pedagogy (D'Agostino et al., 2022). These global insights show that even in varied contexts, common challenges persist which underscore the need to study ICT readiness in teacher education institutions in other settings such as Uganda.

In Africa, efforts to integrate ICT in higher education reveal a mix of progress and challenges. In rural South African universities, a recent systematic review highlighted both the potential of ICT for teaching and learning and persistent barriers such as limited infrastructure, poor internet connectivity, and insufficient technical support (Sithole and Mbukanma, 2024; Wu et al., 2023). Similarly, a continent-wide review of interactive technologies in online teacher education showed that while countries like Kenya and South Africa are making advances, many

institutions struggle with infrastructure, socio-economic constraints, and uneven policy implementation (Oubibi et al., 2024). These findings emphasize that despite pockets of progress, significant disparities remain across African teacher training institutions this points to the urgent need for a localized study of ICT readiness in Uganda.

In East Africa, the readiness of teacher training institutions to adopt ICT continues to face mixed outcomes. In Kenya, studies show that while ICT is increasingly recognized as essential for improving teaching quality, its adoption is slowed by limited infrastructure, inadequate teacher training, and high costs of digital resources (Wanjara and Ogembo, 2024). In Tanzania, research has revealed that teacher education programmes often lack adequate ICT facilities and supportive policies, leaving many teacher trainees underprepared to integrate technology into classroom practice (Shekaoneka & Arthur, 2024). Similarly, Rwanda has made progress in embedding ICT in education through national strategies, yet teacher training colleges still struggle with disparities in digital access and skills development (Mushimiyimana et al., 2025). These findings indicate that although East African countries are moving towards digital education, teacher training institutions remain at varying stages of ICT readiness, making localized studies critical.

In Uganda, ICT integration in teacher training institutions has been recognized as a national priority, but significant gaps remain in readiness. Studies on National Teachers' Colleges have shown that limited infrastructure, unreliable internet access, and insufficient technical support hinder the effective use of ICT in teaching and learning (Veronica et al., 2025). Research further indicates that teacher trainees' adoption of ICT is heavily influenced by the availability of digital tools, institutional policies, and tutor competence (Muweesi et al., 2021). At Makerere University, efforts to mainstream ICT into teacher education have made progress, yet constraints such as unequal access to devices and inadequate training continue to limit impact (Balikuddembe, 2023). These challenges underline the need to assess ICT readiness at Makerere University in order to strengthen the preparation of future educators for technology-enhanced teaching in Uganda.

1.2 Statement of the problem

Information and Communication Technology (ICT) is now central to the delivery of quality education across the world. Teacher training institutions are expected to prepare future educators with the digital skills needed for modern classrooms. Yet in Uganda, institutions such as Makerere University continue to face serious ICT readiness challenges. Limited infrastructure, unreliable internet, unequal access to devices, and low levels of training among

tutors and trainees weaken the effective use of ICT in teacher education (Balikuddembe, 2023; Kisige and Neema-Abooki, 2021). This situation produces teachers who are not fully equipped to integrate technology in schools, which undermines the quality of learning and slows progress toward national education goals.

The problem is significant because it affects Uganda's ability to meet its National Development Plan III (2020/21–2024/25) target of using ICT as a driver of social and economic transformation. At the regional level, it contradicts the African Union's Agenda 2063 vision for a technology-driven education system, while at the global level, it limits progress toward the Sustainable Development Goal 4 (Quality Education). If the challenge of ICT readiness in teacher training institutions is not addressed, Uganda risks producing a generation of educators unprepared for digital teaching demands. However, if institutions like Makerere University improve ICT readiness, they can become hubs for producing digitally skilled teachers who will raise the quality of education and support the country's long-term development priorities. Therefore, it is important to assess the ICT readiness of teacher training institutions, a case study of Makerere University in Uganda.

1.3 Objectives of the study

1.3.1 General objective

To assess the level of ICT readiness in teacher training institutions in Uganda, a case study of Makerere University.

1.3.2 Specific objectives

1. To assess the availability and quality of ICT infrastructure in teacher training institutions, a case study of Makerere University.
2. To examine the socioeconomic factors that affect teacher trainees' access to and use of ICT at Makerere University.
3. To analyse the differences in ICT readiness between female and male teacher trainees at Makerere University.

1.4 Research questions

1. What is the availability and quality of ICT infrastructure in teacher training institutions at Makerere University?
2. What socioeconomic factors affect teacher trainees' access to and use of ICT at Makerere University?

3. What differences exist between female and male teacher trainees in terms of ICT readiness at Makerere University?

1.5 Scope of the study

This includes geographical, content and time scope.

1.5.1 Geographical scope

This study was limited to Makerere University, which is Uganda's oldest and largest institution of higher learning. The university was chosen because it is a leading centre for teacher education and has made efforts to integrate ICT into its programs. Focusing on Makerere University provides an opportunity to understand the readiness of a major teacher training institution and to generate insights that can also inform other institutions in the country.

1.5.2 Content scope

The study focused on ICT readiness in teacher training. It examined the availability and quality of ICT infrastructure, the socioeconomic factors that influenced teacher trainees' access and use of ICT, and the differences in ICT readiness between female and male teacher trainees. The scope was limited to ICT-related aspects within teacher education and did not extend to general ICT use in other departments of the university.

1.5.3 Time scope

The study was conducted for a period of six months, from March to August 2025. This period was sufficient for collecting data, analysing the findings, and drawing meaningful conclusions on ICT readiness in teacher training at Makerere University. The timeframe also aligned with the academic calendar of the university, which ensured access to both trainees and tutors during active semesters.

1.6 Significance of the study

The study would contribute to academic knowledge by providing insights into the level of ICT readiness in teacher training institutions in Uganda, with Makerere University as a case study. It would enrich literature on ICT in higher education by documenting how infrastructure, socioeconomic factors, and gender differences shape the adoption of technology in teacher education. These findings would therefore serve as a valuable reference point for future researchers and students who wish to study ICT and teacher development in similar contexts.

The study findings would be significant to Makerere University as an institution. They would identify gaps in ICT infrastructure, training, and support systems that hinder effective

technology integration in teacher education. From the study findings, the university would be better placed to strengthen its ICT capacity in ways that directly benefit teacher trainees and tutors. This would also help the institution align its programs more closely with national and regional education goals.

From the study findings, policymakers such as the Ministry of Education and Sports would gain evidence to guide the design and implementation of strategies aimed at improving ICT adoption in teacher training institutions. By pointing out the challenges and opportunities, the study would support policy reforms that strengthen digital learning and teacher preparedness, which are already emphasized in Uganda's National Development Plan III (2020/21–2024/25).

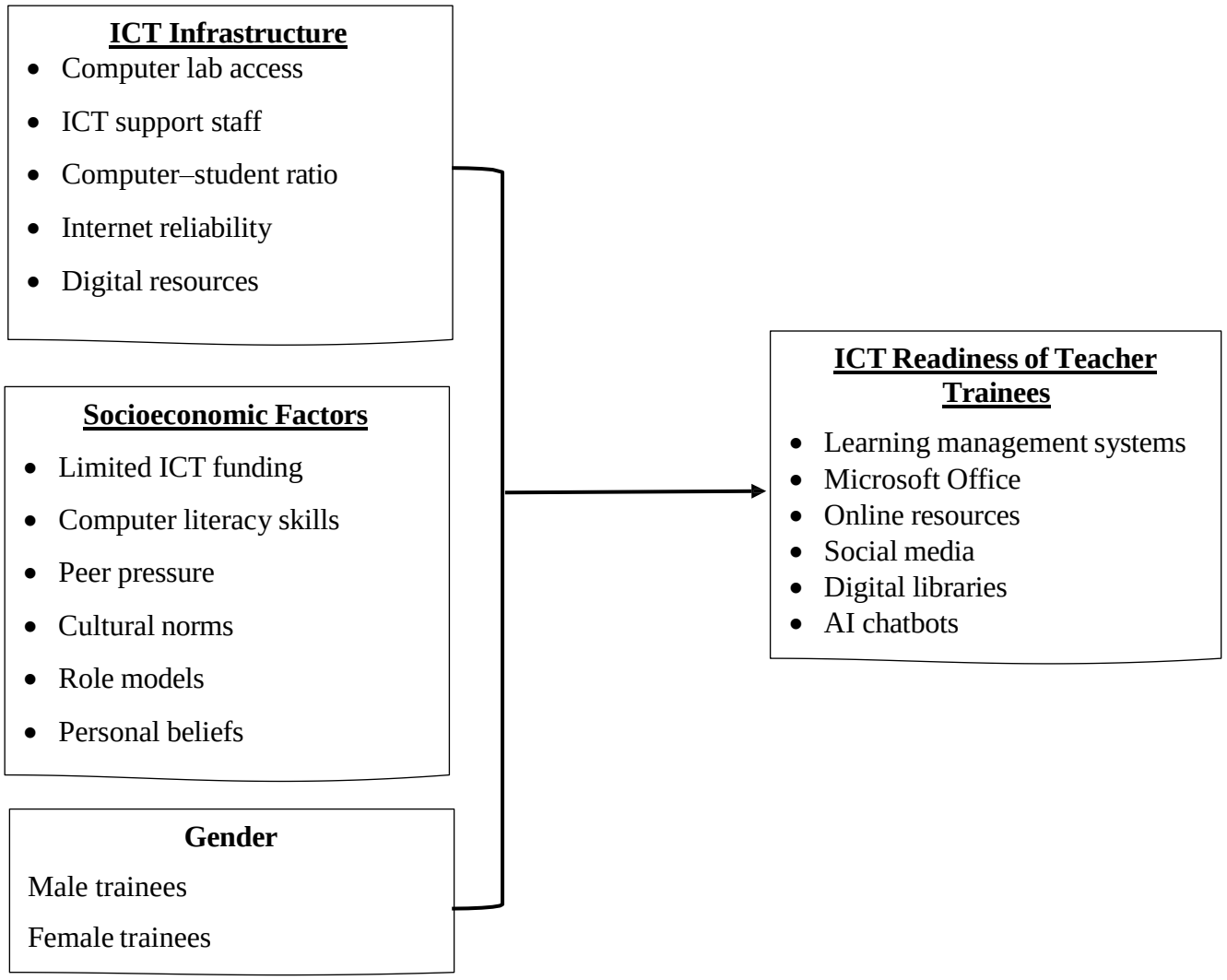
The study would also have socio-economic and global importance. Preparing ICT-competent teachers would not only improve classroom practices in Uganda but also contribute to broader development priorities. At the regional level, this aligns with the African Union's Agenda 2063, which emphasizes technology-driven education. At the global level, the findings would support progress toward Sustainable Development Goal 4 (Quality Education) by promoting inclusive, equitable, and technology-supported learning opportunities for all.

1.7 Justification of the study

The study was justified because ICT readiness in teacher training institutions is directly linked to the quality of education and the ability of future teachers to integrate technology in classrooms. Without such research, institutions like Makerere University risk continuing to produce teachers who are ill-prepared for digital teaching, which would undermine national education reforms, weaken Uganda's progress toward its development priorities, and limit its contribution to regional and global education goals. By identifying existing gaps and opportunities, the study provides timely evidence that supports better planning, investment, and training in ICT for teacher education, ensuring that Uganda does not fall behind in preparing a workforce for the digital age.

1.8 Conceptual Framework

INDEPENDENT VARIABLES **DEPENDENT VARIABLE**



Source: Adopted from the ICT Readiness Model and modified by the researcher.

The conceptual framework above shows the relationship between the independent variables (ICT infrastructure, socioeconomic factors, and gender) and the dependent variable (ICT readiness of teacher trainees). It shows how the availability and quality of ICT infrastructure, the influence of socioeconomic conditions, and gender differences directly affect the level of ICT readiness among teacher trainees at Makerere University. This framework guided the development of the research tools and provided a structured approach for data collection and analysis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed existing literature related to ICT readiness in teacher training institutions. The review was guided by the study objectives and focused on ICT infrastructure, socioeconomic factors, and gender differences as independent variables, as well as ICT readiness of teacher trainees as the dependent variable.

2.2 The availability and quality of ICT infrastructure in teacher training institutions

Reliable access to computer labs is a core enabler of ICT readiness because it shapes daily opportunities for hands-on practice and use of online resources. In Uganda, a case analysis of Kyambogo University found persistent infrastructure shortages and equipment constraints that limit routine student access to campus ICT facilities, pointing to uneven opportunities for digital learning (Lubaale, 2020). In Tanzania's teachers' colleges, a mixed-methods study of 99 participants showed that 65.6% accessed the Internet mainly from college labs, yet only 23.8% reported adequate computers, and daily academic use was just 10–12.5% of respondents, indicating scarcity and limited lab time (Chirwa, 2018). Together, these studies agree that limited lab capacity and access windows suppress meaningful use for learning. Both are context-specific and mainly descriptive, with little minute-by-minute access data. This study narrows this gap by quantifying actual access and perceived sufficiency at Makerere University's teacher training context.

Availability of skilled ICT support staff underpins system uptime, troubleshooting, and user confidence, which in turn affects students' effective use of digital tools. At the University of Dar es Salaam, a regression study with 153 students found that "service quality" was a significant predictor of e-learning satisfaction; this construct captures responsiveness and user support around the platform experience (Mtebe & Raphael, 2018). A qualitative case study from a South African university during the COVID-19 transition reported that students struggled without structured support, training, and dedicated instructional design capacity, underscoring how inadequate support services impede equitable participation (Mpungose, 2020). The pattern is consistent where support is timely and available, engagement improves yet most evidence is institution-specific and not tailored to teacher trainees. This research study addresses this by directly measuring perceived adequacy and responsiveness of ICT support staff in Makerere University's teacher training programs

A favourable computer–student ratio matters because it decides how often trainees can practice with real tools. In Uganda, a Kyambogo University study using document analysis and interviews reported 17 labs against a target of 25 and 862 functional computers against a target of 1,800, suggesting constrained access for a large student body (Lubaale, 2020). In Tanzania, a teachers college survey found very high ratios, for example 1 computer to 40 student teachers in one college, which limited hands-on practice and daily academic use of ICT (Chirwa, 2018). Both studies point to scarcity and crowding that depress effective use. They are institution specific and do not directly test trainee readiness outcomes. This research closes this gap by quantifying the ratio and its link with readiness at Makerere University.

Stable and affordable internet is the backbone of daily ICT use in training. In Uganda, a cross-sectional study at a private university used logistic regression and found that unaffordable internet reduced the odds of adopting e-learning (aOR 0.13, 95 percent CI 0.02–0.84), highlighting how cost and reliability shape student behaviour (Komuhangi et al., 2022). In South Africa, a qualitative case study showed students struggled with data costs and unstable connectivity during the move online, which limited access to platforms and live sessions (Mpungose, 2020). Together these findings show that without dependable connectivity, even available hardware is underused. Both studies are not specific to teacher trainees and one is pandemic-era, so this study will add value by measuring perceived reliability among Makerere trainees today.

Access to quality digital resources like e-books and online courses helps trainees build skills at their own pace. At Kyambogo University, a survey of postgraduate engineering students found e-library use was driven by ease of use, awareness, and search skills, while access restrictions and high internet costs reduced use (Acanit et al., 2024). In Tanzania, a university survey reported that undergraduates used e-resources more than postgraduates and that awareness and training predicted higher usage (Ruzegea and Msonde, 2021). These studies agree that skills and awareness matter, but they are not on teacher trainees and may not reflect Makerere's context. This research study addresses this by linking specific resource access to trainee readiness indicators.

2.3 The socioeconomic factors that affect teacher trainees' access to and use of ICT

Limited ICT funding remains a core socioeconomic barrier to student readiness, because it constrains both institutional infrastructure and learners' access costs. A mixed methods case at Kyambogo University reported inadequate ICT infrastructure and limited funds that slowed digital services and teaching processes (Lubaale, 2020). At Makerere University College of

Health Sciences, an online survey during 2020 found that high internet costs and poor connectivity were major barriers to e-learning, with 56 percent also citing electricity problems and 50 percent citing lack of skills (Olum et al., 2020). Together these studies show how budgets and out-of-pocket data costs work together to depress readiness. Both are strong on context, but one is health students and the other is a different public university, so evidence for teacher training specifically is still thin. This research study will quantify how funding constraints affect teacher trainees at Makerere University today.

Gaps in students' digital skills limit the effective use of learning platforms. At Makerere, more than half of medical and nursing students reported no skills on the official LMS (MUELE), despite high awareness of e-learning tools (Olum et al., 2020). A 2024 study in two Tanzanian public universities surveyed 646 students and found persistent deficits in digital literacy for learning, with only slight variation by programme and a narrowing gender gap (Nalaila & Elia, 2024). The pattern suggests skills gaps are common across East African universities. Both studies use self-report, which can inflate or deflate real competence. Therefore, this research study will address this by measuring task-based LMS skills among teacher trainees at Makerere University.

Peer influence, captured as social influence in adoption models, shapes whether students try and continue using ICT. Among Ugandan university students, social influence positively predicted e-learning acceptance, although facilitating conditions were stronger (Twinamasiko et al., 2021). With pre-service teachers at Kabale University, UTAUT modelling showed social influence was a significant predictor of adoption, but again weaker than facilitating conditions and effort expectancy (Kansiime & Batiibwe, 2023). This agreement across two Ugandan settings supports the idea that peers and significant others matter, but not as much as infrastructure. Both studies were done during or just after the pandemic and focus on specific courses, so there is a need for fresh evidence for teacher training programmes at Makerere University.

Cultural values and norms can set expectations about whether digital learning is appropriate or desirable. A cross-national study in The Gambia and the UK found that individual values and subjective norms were important in predicting e-learning adoption, with clear differences across contexts (Mehta et al., 2019). In Uganda, social influence has a positive effect on e-learning acceptance among university students, reflecting local campus norms that may shape behaviour (Twinamasiko et al., 2021). These studies show culture and norms can tilt intention

in or out, but neither looks directly at teacher training. This research will examine how cultural beliefs within teacher education communities at Makerere University influence readiness.

When teacher educators model technology in authentic ways, pre-service teachers are more likely to value and use ICT. A large survey of 1,035 pre-service teachers in Turkey found that students tended to regard teacher educators as role models for ICT use, with mean role-model scores above the scale midpoint (ÖZÜDOĞRU & ÇAKIR, 2020). A multi-campus case from the Caribbean reported that modelling technology-enhanced instruction improved student engagement and uptake of tools in teacher education courses (Facey-Shaw & Pitter, 2023). Evidence is consistent, but contexts differ from Uganda. This study will test whether visible modelling by Makerere University teacher educators is linked to trainee readiness.

Attitudes, self-efficacy, and perceived control are personal beliefs that strongly shape intention to use ICT. Using an extended Theory of Planned Behavior with pre-service teachers, Hou et al. (2022) showed that constructivist pedagogical beliefs and ICT competencies improved attitudes and perceived control, which in turn raised intention to use technology-enabled learning. Pozas & Letzel (2023a) clustered pre-service teachers and found that those with stronger ICT attitudes and self-efficacy reported higher prospective ICT integration. These findings are robust across settings, yet few Ugandan studies focus on teacher trainees' beliefs.

2.4 The differences in ICT readiness between female and male teacher trainees

Studies often show that male pre-service teachers report slightly higher confidence with ICT, even when real readiness is similar. In Germany, Pozas et al. (2021) used a survey with 103 pre-service teachers and multiple regression; they found no gender gap in expected future ICT use, but men held more positive attitudes, and attitudes strongly predicted intended ICT use (about 57 percent of variance). In Turkey, Gündüz (2020) surveyed 420 pre-service teachers; men scored higher on perceptions of ICT training and support and on self-rated ICT competence, although differences were small and sometimes not statistically strong. Together these studies suggest male trainees may feel more confident, yet measured competence or planned classroom use is often similar, which warns us not to read confidence as readiness.

Evidence from several contexts shows female pre-service teachers are not inherently less ready, and in many competence areas they match males. A study by Sergeeva et al. (2024) in Russia with university pre-service teachers found generally good ICT competence beliefs for both sexes, with only a few small gender differences and very close means in digital safety, communication, and collaboration. In Spain, through a university study of 370 pre-service

educators Cabezas-González et al. (2021) reported that gender could influence perceived digital competence, but effects were not determinant once other factors were considered. These results suggest that when training and access are comparable, female trainees perform on par with males.

Global syntheses report mixed patterns. A systematic review and meta-analysis of studies on ICT use and skills by Qazi et al. (2022) found only a small, statistically non-significant overall advantage for males, indicating that gender gaps are often minor compared with contextual factors like training and infrastructure. Similarly, recent work with pre-service teachers shows that while attitudes can differ slightly by gender, actual competence and intended classroom integration often do not (Pozas & Letzel, 2023). The implication is practical: programs that build positive attitudes and hands-on experience can narrow small attitudinal gaps and make readiness more equal. This research study will therefore measure access, skills, and attitudes separately to see where any gap truly lies in this context.

2.5 Chapter summary

This chapter reviewed literature on ICT readiness in teacher training institutions, focusing on infrastructure, socioeconomic factors, and gender differences, as well as the overall preparedness of trainees. Evidence from Uganda and other settings reveal that restricted access to computer labs, ineffective ICT support services, inferior computer-to-student ratio and poor internet connectivity are issues that still derail the use of ICT in teacher education. Financial means of poor funding, lack of computer literacy skills, cultural factors and the unavailability of role models are other socioeconomic factors hindering readiness. Research also shows that disparity between male and female trainees is usually more credence than fact as males report being more confident and female trainees exhibit comparable competence given balanced training opportunity and access. Most of the reviewed studies have highlighted the common challenges across Africa and beyond yet there are very limited studies that are based in Uganda about teacher training institutions. This research thus covers that gap by studying trainees ICT readiness in Makerere University and putting on evidence that will guide policy and practice in this area on institutions, national, and regional grounds.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The chapter covers the research design, study area, target population, sampling techniques, data collection methods, instruments used, and data analysis procedures. It also includes the validity, reliability, ethical considerations, and anticipated limitations.

3.1 Research design and approach

The study adopted a quantitative cross-sectional research design. This was used because it enabled the collection of data from respondents at one point in time, providing a clear snapshot of ICT readiness at Makerere University without the need for repeated surveys. It was also suitable since it allowed for measurable data that could be statistically analysed to identify patterns and relationships among the study variables.

The study used a quantitative approach. This is because it focused on numerical data that could be objectively measured, compared, and analysed using statistical methods. The approach made it possible to examine differences in ICT readiness across groups such as male and female trainees, and to assess how infrastructure and socioeconomic factors influenced access and use.

3.2 Study area

The study was conducted at Makerere University, located in Kampala, the capital city of Uganda. This was used because Makerere is the oldest and largest public university in the country and serves as a leading centre for teacher education. The university was selected as the study area since it offers a wide range of teacher training programs and provides a suitable setting for examining ICT readiness among teacher trainees. Its large and diverse student population also made it possible to capture different perspectives on access, skills, and use of ICT.

3.3 Population

The population for this study consisted of teacher trainees at Makerere University. This was used because teacher trainees are the direct beneficiaries of ICT facilities in teacher training institutions and their readiness reflects the effectiveness of institutional efforts to integrate technology into education. They were also chosen since they represent future educators, and their preparedness to use ICT will directly influence how technology is adopted in schools across Uganda.

3.4 Inclusion and exclusion criteria

3.4.1 Inclusion criteria

For this study, only teacher trainees currently enrolled in the Faculty of Education during the time of data collection were included. This ensured that the study captured the most relevant and up-to-date information about ICT usage.

3.4.2 Exclusion criteria

Trainees who were not present during the time of data collection or were not actively attending classes during the study period were excluded.

3.5 Sample size and sampling techniques

3.5.1 Determination of sample size

The study used Cochran's formula with 95% confidence, p = 0.50, and 10% precision which yielded 96. This was increased by 18% to account for nonresponse, giving a final sample size of 113. The sample size was calculated using Cochran's (1963) formula:

$$n_o = \frac{z^2 \times p(1-p)}{e^2}$$

Where:

Z=1.96 (standard value for 95% confidence),

p = 0.50 (assumed proportion for maximum variability),

e = 0.10 (margin of error at 10%).

$$n_o = \frac{1.96^2 \times 0.5 \times 0.5}{0.10^2} = 96.04 \approx 96$$

To account for possible nonresponse, the sample was increased by 18%:

n = 96 × 1.18 = 113.3 ≈ 113

Thus, the final sample size used in the study was 113 teacher trainees.

3.5.2 Sampling technique

A simple random sampling technique was used to select the teacher trainees who participated in the study. This technique was chosen because it gave every trainee in the population an equal chance of being selected, thereby reducing selection bias. It was also appropriate as it ensured

that the sample was more representative of the population by including trainees with different backgrounds, genders, and levels of ICT usage.

3.6 Data collection methods

3.6.1 Primary data collection

Primary data for this study was collected using structured questionnaires that were administered to teacher trainees at Makerere University. The questionnaires consisted mainly of closed-ended questions organised on a Likert scale. This was used because Likert scales allow respondents to indicate the degree to which they agree, disagree, or feel ready in relation to specific ICT indicators. The tool captured information on individual ICT readiness, availability and quality of ICT infrastructure, and the socioeconomic barriers to ICT access. This method was chosen because it provides quantifiable data that can be systematically analysed to assess patterns, differences, and relationships relevant to ICT readiness.

3.7 Data collection tools and instruments

The main instrument used in this study was a structured questionnaire. This was designed to be clear and easy to complete, bearing in mind that some participants might not be highly proficient in English. The questionnaire comprised closed-ended questions with Likert scale responses (such as Strongly agree, Agree, Disagree, strongly disagree or not ready, less ready, Ready, more ready, much ready). This format was chosen because it simplifies responses, reduces ambiguity, and makes data analysis more efficient.

The questionnaire was divided into four sections, each aligned to the study objectives: Socio-demographic information of respondents, Availability and quality of ICT infrastructure at Makerere University, Socioeconomic factors affecting ICT use among teacher trainees and Differences in ICT readiness between male and female trainees, focusing on their self-reported readiness to use specific ICT tools.

3.8 Data collection procedure

Before collecting data, clearance to conduct the study was obtained from the School of Education, Makerere University. This was necessary to ensure that the research met institutional requirements and respected university procedures. After clearance was granted, the researcher sought permission from faculty administrators to approach the teacher trainees. The questionnaires were then distributed to the selected trainees during scheduled lecture sessions. Respondents were informed about the purpose of the study, assured of confidentiality,

and their consent was obtained before participation. The completed questionnaires were collected immediately after filling to minimise loss and ensure data quality.

3.9 Data analysis

To analyse the data, SPSS version 25 software was used. The quantitative data collected from the questionnaires was analysed using descriptive and inferential statistics. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were used to summarize and describe the patterns of ICT access and use among the teacher trainees. Frequency tables and bar charts were used to present the results visually for easier interpretation.

3.10 Data quality control

3.10.1 Validity

To ensure validity, a pilot study was conducted with a small group of teacher trainees at Makerere University. This was used to test the clarity, relevance, and appropriateness of the questionnaire items in relation to the study objectives. Feedback from the pilot group helped the researcher refine the questions, ensuring that they accurately captured ICT readiness, infrastructure, and socioeconomic factors. The pilot study confirmed that the instrument was aligned with the intended purpose of the research.

3.10.2 Reliability

The reliability of the questionnaire was assessed using Cronbach's Alpha, which measures internal consistency. This was used to confirm that items within each section of the questionnaire were measuring the same underlying concept. A Cronbach's Alpha value above 0.70 was considered acceptable and indicated that the tool was reliable for data collection in this study.

3.11 Ethical considerations

Informed consent was obtained from all participants, who were informed about the study's purpose, their involvement, and their right to withdraw anytime without consequences. Participants signed consent forms to confirm voluntary participation. To ensure confidentiality and anonymity, personal identifiers were removed from the data, and only the research team had access. Results were presented in aggregate form to prevent individual identification. The study was approved by the Makerere University Research Ethics Committee, ensuring adherence to ethical standards for participant protection and research integrity.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents the findings of the study and interprets them in line with the study objectives. The data that were collected from teacher trainees at Makerere University are summarised, analysed, and discussed in order to show the current state of ICT readiness. The results are organised according to the objectives of the research, including the availability and quality of ICT infrastructure, the socioeconomic factors affecting ICT use, and the differences in ICT readiness between male and female trainees.

4.2 Response rate

Out of a total of 113 teacher trainees who were planned to participate in the study, only 103 completed and returned valid questionnaires. This gave a response rate of 91%, which was considered very good for this type of cross-sectional survey. According to Meyer et al. (2022), a response rate of 70% and above is acceptable in educational research, and therefore the 91% obtained in this study was sufficient to ensure reliability and representativeness of the findings.

4.3 Demographic characteristics of respondents

The demographic characteristics of respondents for this study included; gender and year of study.

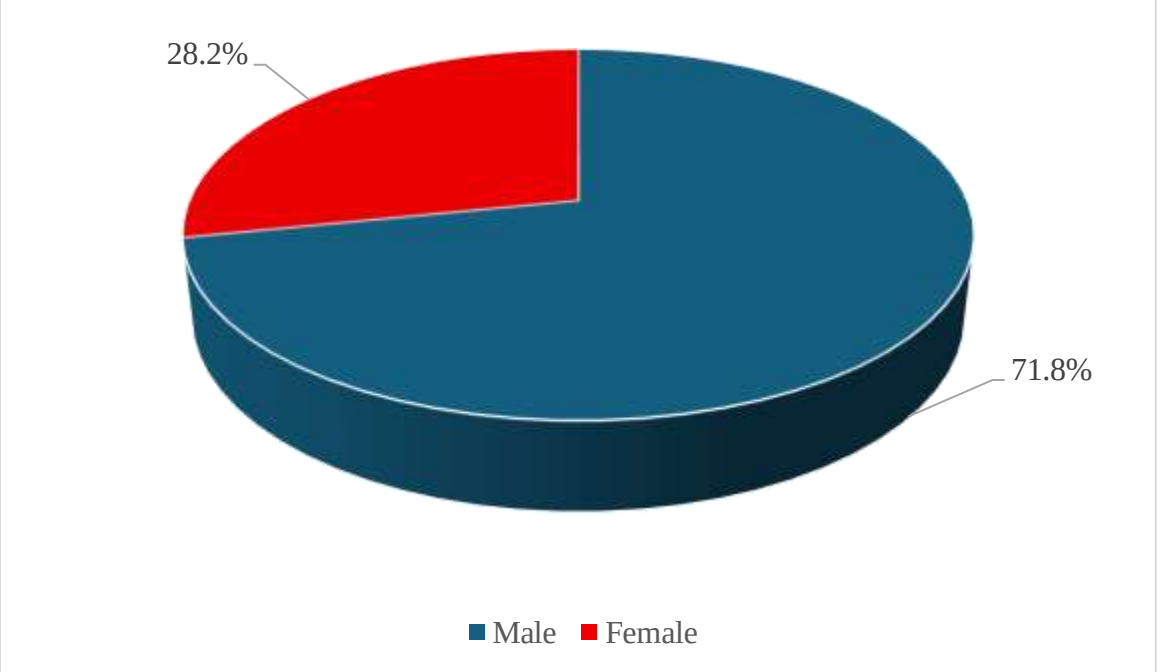


Fig. 4.1: Gender distribution of respondents

With regard to gender, the majority, 74/103 (71.8%) of the respondents were male while the lowest number 29/103 (28.2%) of the respondents were female.

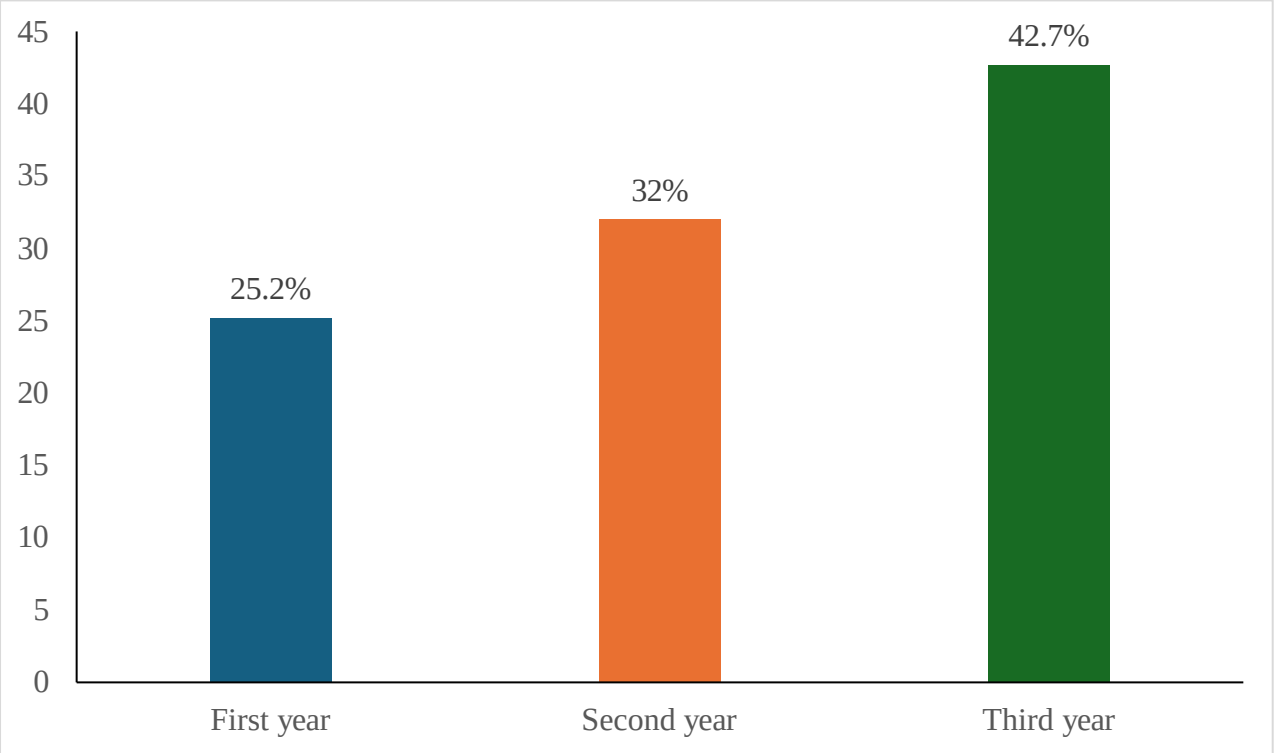


Fig. 4.2: Year of study distribution of respondents

In terms of the year of study, the highest number, 44/103 (42.7%) of the respondents were in their third year, followed by 33/103 (32.0%) who were in their second year, while the lowest number, 26/103 (25.2%), of the respondents were in their first year.

4.4 The availability and quality of ICT infrastructure in teacher training institutions, a case study of Makerere University

Table 4.1: Availability and quality of ICT infrastructure

Variables	Frequency	Percent	Mean	Std. Deviation
Computer labs are accessible to students when needed				
Strongly disagree	36	35	1.97	0.891
Disagree	40	38.8		
Agree	21	20.4		
Strongly agree	6	5.8		
Total	**103**	**100**		
There are adequate ICT support staff to assist students and teachers				
Strongly disagree	24	23.3	2.09	0.841
Disagree	54	52.4		
Agree	17	16.5		
Strongly agree	8	7.8		
Total	**103**	**100**		
The computer student ratio in the computer lab is sufficient				
Strongly disagree	38	36.9	1.93	0.889

Disagree	40	38.8		
Agree	19	18.4		
Strongly agree	6	5.8		
Total	**103**	**100**		
The internet connectivity at your institution is good and reliable				
Strongly disagree	12	11.7	3.06	1.027
Disagree	14	13.6		
Agree	34	33		
Strongly agree	42	40.8		
Total	**103**	**100**		
There are adequate digital learning resources (E-books, online courses etc)				
Strongly disagree	18	17.5	2.5	0.928
Disagree	28	27.2		
Agree	44	42.7		
Strongly agree	13	12.6		
Total	**103**	**100**		

Regarding the respondents' views on computer labs being accessible to students when needed, the highest number, 40/103 (38.8%), of the respondents disagreed, while the least number, 6/103 (5.8%), strongly agreed (mean = 1.97, S.D. = 0.891). Concerning the statement that there are adequate ICT support staff to assist students and teachers, the highest number, 54/103 (52.4%), of the respondents disagreed, while the least number, 8/103 (7.8%), strongly agreed (mean = 2.09, S.D. = 0.841).

In terms of the sufficiency of the computer–student ratio in the computer lab, the highest number, 40/103 (38.8%), of the respondents disagreed, while the least number, 6/103 (5.8%), strongly agreed (mean = 1.93, S.D. = 0.889). For the statement that the internet connectivity at the institution is good and reliable, the highest number, 42/103 (40.8%), of the respondents strongly agreed, while the least number, 12/103 (11.7%), strongly disagreed (mean = 3.06, S.D. = 1.027).

With regard to the adequacy of digital learning resources (e-books, online courses, etc.), the highest number, 44/103 (42.7%), of the respondents agreed, while the least number, 13/103 (12.6%), strongly agreed (mean = 2.50, S.D. = 0.928).

4.5 The socioeconomic factors that affect teacher trainees' access to and use of ICT at Makerere University

Table 4.2: Socioeconomic factors that affect teacher trainees' access to and use of ICT

Variables	Frequency	Percent	Mean	Std. Deviation
Limited funding for ICT				
Strongly disagree	7	6.8	3.22	0.874
Disagree	9	8.7		

Agree	41	39.8		
Strongly agree	46	44.7		
Total	**103**	**100**		
Lack of computer literacy skills				
Strongly disagree	12	11.7		
Disagree	14	13.6		
Agree	40	38.8	2.99	0.985
Strongly agree	37	35.9		
Total	**103**	**100**		
Peer pressure				
Strongly disagree	34	33		
Disagree	49	47.6		
Agree	15	14.6	1.91	0.818
Strongly agree	5	4.9		
Total	**103**	**100**		
Culture/society norms e.g. some cultures believe social media is evil				
Strongly disagree	45	43.7		
Disagree	31	30.1		
Agree	19	18.4	1.9	0.965
Strongly agree	8	7.8		
Total	**103**	**100**		
Lack of inspiring role models				
Strongly disagree	26	25.2		
Disagree	31	30.1		
Agree	38	36.9	2.27	0.931
Strongly agree	8	7.8		
Total	**103**	**100**		
Personal decision and beliefs				
Strongly disagree	9	8.7		
Disagree	17	16.5		
Agree	32	31.1	3.1	0.975
Strongly agree	45	43.7		
Total	**103**	**100**		

Regarding the statement that limited funding for ICT affects readiness, the highest number, 46/103 (44.7%), of the respondents strongly agreed, while the least number, 7/103 (6.8%), strongly disagreed (mean = 3.22, S.D. = 0.874). Concerning the statement that lack of computer literacy skills affects readiness, the highest number, 40/103 (38.8%), of the respondents agreed, while the least number, 12/103 (11.7%), strongly disagreed (mean = 2.99, S.D. = 0.985).

With regard to the effect of peer pressure on ICT readiness, the highest number, 49/103 (47.6%), of the respondents disagreed, while the least number, 5/103 (4.9%), strongly agreed (mean = 1.91, S.D. = 0.818). For the influence of cultural or societal norms (e.g., some cultures believe social media is evil), the highest number, 45/103 (43.7%), of the respondents strongly disagreed, while the least number, 8/103 (7.8%), strongly agreed (mean = 1.90, S.D. = 0.965).

Regarding the statement that lack of inspiring role models hinders ICT readiness, the highest number, 38/103 (36.9%), of the respondents agreed, while the least number, 8/103 (7.8%), strongly agreed (mean = 2.27, S.D. = 0.931). With regard to personal decision and beliefs, the highest number, 45/103 (43.7%), of the respondents strongly agreed, while the least number, 9/103 (8.7%), strongly disagreed (mean = 3.10, S.D. = 0.975).

4.6 The differences in ICT readiness between female and male teacher trainees at Makerere University

Table 4.3: Group statistics of the independent sample t test

Variable	Gender	N	Mean	Std. Deviation	Std. Error Mean
ICT readiness	Male	74	20.6757	3.91383	.45497
	Female	29	19.7241	2.37391	.44082

Regarding ICT readiness, male trainees (N = 74) had a slightly higher mean score (M = 20.68, SD = 3.91) compared to female trainees (N = 29), who had a mean score of (M = 19.72, SD = 2.37).

Table 4.4: Independent samples t test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	Upper
ICT readiness	Equal variances assumed	4.581	.035	1.222	101	.225	.95154	.77870	-.59319	2.49627
	Equal variances not assumed			1.502	83.209	.137	.95154	.63350	-.30843	2.21150

The Levene's Test for Equality of Variances produced a significant result (F = 4.581, p = .035), suggesting that the assumption of equal variances was violated. Therefore, the results from the row "Equal variances not assumed" were considered. Based on this test, the difference in ICT readiness between male trainees (M = 20.68, SD = 3.91) and female trainees (M = 19.72, SD = 2.37) was not statistically significant, t(83.209) = 1.502, p = .137. This means that although males scored slightly higher on ICT readiness than females, the difference was not large enough to be considered meaningful at the 0.05 level of significance.

4.7 Chapter summary

This chapter presented and interpreted the findings of the study according to the stated objectives. The results showed that while Makerere University provides some ICT infrastructure, challenges remain in areas such as computer lab access, computer–student ratios, and adequacy of ICT support staff. Gaining access to digital resources and connectivity to the Internet was reported as more favourable by many trainees. The presence of socioeconomic factors was also identified to be a significant determinant, with low ICT funding, computer literacy skills, and personal beliefs being a major obstacle to being ready, and peer pressure and cultural related beliefs were minor factors. Analysis also indicated that male trainees had slightly higher ICT readiness scores than female trainees, but the difference was not significant. On the whole, the results indicate that the issue of ICT readiness at Makerere University is more limited by structural and resource factors rather than gender disparities, setting out the areas that could become the focus of the institution in order to enhance the use of ICT in the teacher training process.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion, conclusions, and recommendations of the study. The discussion interprets the findings in relation to the study objectives and compares them with existing literature reviewed in Chapter Two. The conclusions provide a summary of the main insights drawn from the results, while the recommendations suggest practical actions and policy directions to improve ICT readiness in teacher training institutions.

5.2 Discussion of findings

5.2.1 The availability and quality of ICT infrastructure in teacher training institutions

Regarding the accessibility of computer labs, the highest number, 38.8%, of the respondents disagreed that the labs were accessible when needed. This implies that many trainees still face challenges in accessing laboratories, which limits hands-on ICT practice. This result is in line with Lubaale (2020), who reported persistent shortages of ICT infrastructure at Kyambogo University, and Chirwa (2018), who observed that only 23.8% of Tanzanian trainees found computers adequate, with restricted lab time.

With regard to ICT support staff, the majority, 52.4%, of the respondents disagreed that there were enough staff to assist them. This suggests that many trainees lack timely technical help, which may discourage frequent ICT use. This aligns with Mtebe and Raphael (2018), who showed that service quality, including technical support, predicted e-learning satisfaction in Tanzania, and Mpungose (2020), who reported that inadequate support during the COVID-19 shift hindered South African students.

In terms of the computer–student ratio, the highest number, 38.8%, of the respondents disagreed that it was sufficient. This indicates that the available computers are too few compared to the number of trainees, which restricts usage opportunities. This concurs with Lubaale (2020), who documented shortages of functional computers at Kyambogo University, and Chirwa (2018), who found high ratios (as high as 1:40) in Tanzanian colleges that reduced effective ICT learning.

For internet connectivity, the highest number, 40.8%, of the respondents strongly agreed that it was good and reliable. This suggests that Makerere University trainees benefit from relatively stable internet, which supports access to online resources. This finding aligns with Komuhangi et al. (2022), who showed that internet reliability strongly shaped e-learning adoption in

Uganda, but contrasts with Mpungose (2020), who reported that unstable connectivity was a serious challenge for South African universities.

With regard to digital learning resources, the highest number, 42.7%, of the respondents agreed that resources such as e-books and online courses were adequate. This indicates that many trainees have access to supportive digital content for independent learning. This is in line with Acanit et al. (2024), who found that ease of access and awareness influenced e-resource use among postgraduate students at Kyambogo, and Ruzegea and Msonde (2021), who reported that awareness and training predicted higher e-resource usage in Tanzanian universities.

5.2.2 The socioeconomic factors that affect teacher trainees' access to and use of ICT

Regarding limited funding for ICT, the highest number, 46/103 (44.7%), of the respondents strongly agreed that it hindered readiness. This implies that inadequate financial resources remain a major barrier to accessing and sustaining ICT facilities for trainees. This finding is in line with Lubaale (2020), who reported that lack of funds constrained ICT infrastructure at Kyambogo University, and Olum et al. (2020), who found that high internet costs and poor connectivity limited e-learning adoption among Makerere health students.

Concerning computer literacy skills, the highest number, 40/103 (38.8%), of the respondents agreed that low skills affected their readiness. This suggests that many trainees struggle with the digital competencies necessary for effective ICT integration. This aligns with Olum et al. (2020), who observed that more than half of Makerere medical students lacked skills on the official LMS (MUELE), and Nalaila and Elia (2024), who reported persistent digital literacy gaps among Tanzanian university students.

With regard to peer pressure, the majority, 49/103 (47.6%), of the respondents disagreed that it influenced their ICT readiness. This indicates that peer influence was not a strong determinant of readiness for most trainees in this study. This result contradicts Twinamasiko et al. (2021), who found that social influence predicted e-learning acceptance among Ugandan students, and Kansiime and Batiibwe (2023), who showed that peer influence was a significant factor among pre-service teachers at Kabale University.

For cultural or societal norms, the highest number, 45/103 (43.7%), of the respondents strongly disagreed that such norms affected their ICT readiness. This suggests that cultural beliefs were not perceived as a serious barrier to ICT adoption among Makerere trainees. This finding contrasts with Mehta et al. (2019), who showed that subjective norms influenced adoption

decisions in The Gambia, but it aligns with Twinamasiko et al. (2021), who found that social influence mattered less compared to infrastructure.

Regarding inspiring role models, the highest number, 38/103 (36.9%), of the respondents agreed that lack of role models limited their ICT readiness. This indicates that trainees still rely heavily on the example set by teacher educators in using ICT for learning. This is in line with Özüdoğru and Çakır (2020), who found that Turkish pre-service teachers regarded educators as ICT role models, and Facey-Shaw and Pitter (2023), who reported that modelling improved engagement in Caribbean teacher training.

With regard to personal decision and beliefs, the highest number, 45/103 (43.7%), of the respondents strongly agreed that these shaped their ICT readiness. This suggests that attitudes, confidence, and self-perceptions play a key role in determining whether trainees embrace ICT tools. This concurs with Hou et al. (2022), who showed that beliefs and self-efficacy predicted ICT adoption using an extended TPB model, and Pozas and Letzel (2023), who found that pre-service teachers with stronger ICT attitudes had higher intentions to integrate technology.

5.2.3 The differences in ICT readiness between female and male teacher trainees

Regarding ICT readiness by gender, male trainees (N = 74) had a slightly higher mean score (M = 20.68, SD = 3.91) compared to female trainees (N = 29), who had a mean score of (M = 19.72, SD = 2.37). However, the Independent Samples t-test showed that this difference was not statistically significant, $t(83.209) = 1.502$, $p = .137$. This implies that gender was not a strong determinant of ICT readiness among Makerere University teacher trainees, and both male and female students demonstrated comparable levels of readiness.

This result is in line with Sergeeva et al. (2024), who found only small and insignificant gender differences in ICT competence beliefs among Russian pre-service teachers, and Cabezas-González et al. (2021), who showed that gender effects on digital competence were minor once other factors such as training were considered. It also concurs with Qazi et al. (2022), whose systematic review found that gender gaps in ICT use were small and often statistically non-significant.

At the same time, the finding contrasts with studies such as Pozas et al. (2021) in Germany and Gündüz (2020) in Turkey, where male trainees reported more positive ICT attitudes or self-rated competence, even if actual usage patterns were similar. These differences suggest that while men may sometimes express greater confidence, this does not always translate into meaningful readiness advantages.

5.3 Conclusion

The study aimed to assess the level of ICT readiness in teacher training institutions in Uganda, a case study of Makerere University.

5.3.1 Conclusions on the availability and quality of ICT infrastructure in teacher training institutions

i. The study revealed that access to computer labs, adequacy of ICT support staff, and the computer–student ratio were still inadequate, limiting effective integration of ICT in training.
ii. It was found that internet connectivity and digital learning resources were relatively better, showing some progress in ICT provision.

5.3.2 Conclusions on the socioeconomic factors affecting ICT use among teacher trainees

i. The study revealed that limited funding, lack of computer literacy skills, and absence of role models significantly affected ICT readiness among trainees.
ii. It was found that peer pressure and cultural norms were less influential, while personal decisions and beliefs strongly shaped ICT use.

5.3.3 Conclusions on gender differences in ICT readiness among teacher trainees

i. The study revealed that male trainees scored slightly higher in ICT readiness, but the difference with female trainees was not significant.
ii. It was found that gender was not a major determinant of ICT readiness, as both groups demonstrated comparable levels when given similar opportunities.

5.4 Recommendations

1. The university administration should prioritise investment in ICT infrastructure by expanding access to computer laboratories, improving the computer–student ratio, and employing more ICT support staff. This will ensure that trainees have adequate resources and timely technical assistance to strengthen their readiness for ICT use in teaching and learning.
2. The government and education policy makers should increase budget allocations for ICT in teacher training institutions. This should include subsidies for internet connectivity, provision of digital learning resources, and capacity-building programmes. Such support will create an enabling environment where teacher trainees can fully utilise ICT in their training and future teaching careers.

3. Teacher educators should serve as role models in ICT integration by consistently using technology in their teaching practices. This will inspire trainees to adopt ICT positively, improve their digital skills, and develop confidence in applying technology in their future classrooms. Regular training and workshops should also be incorporated to enhance both educators' and trainees' ICT competence.
4. Teacher trainees should take personal initiative in developing their ICT skills by utilising available resources such as digital libraries, e-learning platforms, and online courses. They should also cultivate positive attitudes and beliefs towards ICT use, since personal decisions and confidence strongly influence readiness. Active engagement will ensure they graduate with practical skills for integrating technology into their professional practice.

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APPENDICIES

Appendix I: SURVEY AND QUESTIONNAIRE ON ICT READINESS IN UGANDAN TEACHER TRAINING INSTITUTIONS

SECTION A: BIODATA (Tick the appropriate box)

Gender:

Male ☐

Female ☐

Year of study:

First Year ☐

Second Year ☐

Third Year ☐

Subjects of specialization: …….

SECTION B: individual ICT readiness

How ready are you in using the following ICT tools in teaching and learning? (tick the appropriate box)

ICT tool	Not ready	Less ready	ready	More ready	Much ready
Learning Management Systems					
Microsoft Office					
online educational resources					
Social media					
Digital libraries and e-books					
AI Chat box (ChatGpt, Gemni, etc)					

SECTION C: availability and quality of ICT infrastructure

The following are the indicators of availability and quality of infrastructure in your institution. To what extent do you agree with the statement below.

Factor	Strongly disagree	Disagree	Agree	Strongly agree
Computer labs are accessible to students when needed				
There are adequate ICT support staff to assist students and teachers				
The computer to student ratio in the computer lab is sufficient				
The internet connectivity at your institution is good and reliable				
There are adequate digital learning resources (e-books, online courses, etc				

SECTION D: Socioeconomic Barriers to ICT Access

The following are the social economic factors that hinder your ICT readiness. To what extent do you agree? (tick the appropriate box)

Factor	Strongly disagree	Disagree	Agree	Stongly agree
Limited funding for ICT				
Lack of computer literacy skills				
Peer pressure				
Culture/society norms (e.g. some cultures believe that social media is evil)				
Lack inspiring role models				
Personal decision and beliefs				

THANK YOU.