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Knowledge, Attitudes, and Practices Among Tutors Towards the Use of Information and Communication Technology in Teaching at Uganda Institute of Allied Health and Management Sciences, Mulago

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Acceptance.

This cross-sectional study assessed tutors' knowledge, attitudes, and practices (KAP) regarding ICT integration in teaching at the Uganda Institute of Allied Health and Management Sciences (UIAHMS), Mulago. Conducted between November 2023 to March 2024, the study employed quantitative methods with 80 tutors selected via convenience sampling. Data were collected using validated questionnaires and analysed using SPSS v27, covering socio-demographics, ICT knowledge (11 items), attitudes (9-item Likert scale), and practices (8 items). Content validity was ensured through expert review (CVI >0.8) and pilot testing (Cronbach's $\alpha=0.78$). Ethical approval was obtained from Health Tutors' College Research Committee, with participant anonymity maintained. Key findings revealed: 95% of tutors received ICT training, yet significant knowledge gaps persisted in graphic applications (81.25% unskilled) and statistical software (88.75%). While 86.25% demonstrated positive attitudes, only 21.25% showed satisfactory ICT integration, primarily using technology for accessing materials (83.75%) rather than interactive teaching (27.5%) or assessments (13.75%). The study recommends targeted training programs and institutional policy reforms to bridge the implementation gap through: 1) Department-specific ICT training focusing on pedagogical integration, 2) Institutional investment in reliable technical support systems, and 3) Policy reforms to align national ICT strategies with institutional implementation capacities. These findings contribute to understanding barriers to technology adoption in resource-constrained health education settings.

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INTRODUCTION

The global shift toward digital health professions education has proven critical for developing competent healthcare workforces, with technology-enhanced learning shown to significantly improve knowledge retention and clinical decision-making (WHO, 2021). While developed nations report 89% educator proficiency in using digital tools like virtual patient simulations (UNESCO, 2023), sub-Saharan Africa faces persistent challenges, including infrastructure gaps and faculty training limitations (World Bank, 2022).

Uganda's National ICT Policy for Education (2022) mandates nationwide technology integration, yet implementation lags in allied health training institutions. At UIAHMS - which trains 1,200 health professionals annually across 22 programs - smart classroom utilisation remains below 10% despite significant 2022 investments (UIAHMS ICT Report, 2023). This disparity between resource availability and usage reveals critical gaps in our understanding of educator readiness.

Current research focuses predominantly on general education or medical schools (Kibirige, 2023; Byakika et al., 2015), leaving allied health institutions understudied. Contradictory findings from Malaysia (Ramadass & Shah, 2022) and Uganda (Twebaze, 2023) further highlight the need for context-specific research. This study employs the Technology Acceptance Model to systematically examine knowledge, attitudes and practices among UIAHMS tutors - who train 35%

of Uganda's allied health workforce yet remain underrepresented in educational technology research (Davis, 1989).

The findings will address three urgent needs: (1) optimising UIAHMS's ICT investments, (2) informing national policy implementation, and (3) contributing to global understanding of technology integration in resource-constrained health education. By bridging the gap between policy aspirations and classroom realities, this research supports the development of Uganda's healthcare workforce while offering lessons for similar contexts worldwide.

PROBLEM STATEMENT

The integration of Information and Communication Technology (ICT) in teaching and learning is widely recognised as essential for achieving quality education in Uganda. While the government has implemented supportive policies such as the National ICT Policy and Implementation Strategy (2014), significant challenges persist in tertiary institutions like the Uganda Institute of Allied Health and Management Sciences (UIAHMS), Mulago.

It was noted that despite the institution's introduction of smart screens and active promotion of ICT use during the 2022/2023 academic year, adoption rates remained critically low. Institutional reports indicate only 3% of tutors incorporated these technologies into their lectures (UIAHMS ICT Department, 2023). This discrepancy between technological availability and actual classroom

application raises serious concerns about the effectiveness of current ICT integration strategies and their impact on educational quality.

The Technology Acceptance Model posits that successful technology adoption depends on users' knowledge, attitudes, and practices (Davis, 1989). However, there exists a paucity of research examining these critical factors among tutors in Ugandan allied health education institutions. This gap in understanding hinders the development of targeted interventions to improve ICT utilisation. Without comprehensive data on tutors' technological competencies, perceptions, and usage patterns, institutions like UIAHMS cannot effectively address the barriers limiting full integration of these essential teaching tools.

This study, therefore, sought to investigate the knowledge gaps, attitudinal barriers, and practical challenges that contribute to the underutilization of ICT resources at UIAHMS. The findings provided evidence-based insights to guide institutional policies and professional development programs aimed at enhancing technology integration in health professions education.

LITERATURE

The global education landscape has undergone a significant transformation through Information and Communication Technology (ICT) integration, particularly in health professions education (WHO, 2021). Developed nations demonstrate advanced adoption, with Singapore reporting 89% tutor proficiency in digital pedagogy (Trucano, 2014). The Technology Acceptance Model (Davis, 1989) provides a theoretical framework for understanding adoption patterns, emphasising perceived usefulness and ease of use as critical determinants. Systematic reviews identify infrastructure (75%), training (68%), and digital literacy (72%) as key barriers in developing contexts (Mustafa et al., 2024), while developed countries benefit from reliable systems supporting technology-enhanced learning (UNESCO, 2023).

African institutions face unique challenges in ICT integration, with studies revealing significant disparities between policy and practice. In Malawi, faculty at the College of Medicine demonstrated stronger hardware knowledge (mean=3.14/5) than software proficiency (mean=2.71), reflecting training gaps in pedagogical applications (Mailizar & Fan, 2020). Nigerian nursing educators predominantly used ICT for communication (30.8%) rather than instructional purposes (Chukwu, 2016), while South African studies reported only 34% of rural institutions achieving meaningful integration (Shava, 2022). These findings suggest regional patterns of underutilization despite growing technology access.

Uganda's National ICT Policy (2022) mandates comprehensive technology integration, yet implementation remains inconsistent across educational tiers. At Bishop Stuart University, 47.8% of tutors acquired skills through self-directed learning rather than formal training (Twebaze, 2023), mirroring findings from UIAHMS, where 66.25% depended on institutional workshops for digital upskilling. Kibirige's (2023) study of STEM educators revealed persistent challenges: unreliable electricity (78%), inadequate devices (65%), and limited technical support (82%) – factors corroborated by UIAHMS tutors' reports of technical difficulties hindering implementation (68.75%). The COVID-19 pandemic accelerated online learning adoption, yet post-pandemic assessments show regression to traditional methods in 62% of Ugandan institutions (Kansiime & Batiibwe, 2023).

Research consistently demonstrates discordance between educators' ICT knowledge and classroom practices. While Malaysian studies found 61% of tutors regularly using digital tools (Ramadass & Shah, 2022), comparable Ugandan institutions report only 21.25% satisfactory integration (UIAHMS ICT Report, 2023). Positive attitudes (86.25% in the current study) often outweigh actual usage due to contextual constraints, supporting

Gondwe's (2022) assertion that attitude alone cannot drive adoption without institutional support systems. Notably, assessment-related ICT use remains critically low (13.75%) across African health education, potentially undermining competency-based evaluation recommended by WHO (2021).

The reviewed studies revealed three critical gaps this research addressed: (1) limited focus on allied health education compared to medical schools, (2) insufficient examination of the knowledge-attitude-practice disconnect in resource-constrained settings, and (3) absence of institutional-level data to inform UIAHMS-specific interventions. By employing the Technology Acceptance Model within Uganda's allied health context, this study contributes a nuanced understanding of digital integration barriers while proposing actionable solutions for similar institutions.

METHODOLOGY

A cross-sectional descriptive study design was employed in this research, involving teaching staff of the Uganda Institute of Allied Health and Management Sciences (UIAHMS) who were present on campus during the data collection period. The study population comprised tutors across all programs at the institution, regardless of gender or academic rank. A convenience sampling technique was utilised to select 80 participants, which was determined using the Krejcie and Morgan (1970) sample size table for a population of approximately 150 tutors, ensuring proportional representation from each academic department based on their relative sizes within the institution.

The study utilised a structured questionnaire containing both open-ended and closed-ended questions, incorporating a 5-point Likert scale component to measure attitudes and perceptions. Prior to full implementation, formal permission was

obtained from the principal tutor of UIAHMS, and three research assistants were trained in standardised data collection procedures. The research instrument underwent pretesting through a pilot study conducted with 10 tutors at the same institution, after which necessary refinements were made to improve the clarity and relevance of the questions.

All questionnaires were numerically coded to maintain participant confidentiality, and written informed consent was obtained from each tutor prior to participation. The study examined attitudes and perceptions as dependent variables, with knowledge levels and socio-demographic characteristics serving as independent variables. Quantitative data collected through closed-ended questions were analysed using the Statistical Package for Social Sciences (SPSS) version 27, with results presented in frequency tables and descriptive statistics. Qualitative responses from open-ended questions were analysed thematically and presented in narrative form to provide contextual understanding of the quantitative findings.

The research maintained strict ethical standards throughout the data collection process, ensuring voluntary participation and protecting respondent anonymity. Completed questionnaires were stored securely, with access limited to the principal investigator and designated research team members. This methodological approach allowed for a comprehensive assessment of tutors' knowledge, attitudes, and perceptions while maintaining scientific rigour appropriate for educational research in resource-constrained settings.

RESULTS

Socio-Demographic Characteristics

Table 1 presents participant profiles:

Table 1: Socio-Demographic Characteristics (N=80)

Variable	Category	Frequency	Percentage
Gender	Male	47	58.75%
	Female	33	41.25%
Age	28-37 years	39	48.75%
Highest Education	Bachelor's	48	60.00%

The table above presents the baseline characteristics of the 80 tutor participants at UIAHMS. The data shows a gender distribution favouring male tutors (58.75%) over female tutors (41.25%), reflecting broader trends in Ugandan health education staffing. The age distribution reveals that nearly half of the respondents (48.75%) fall within the 28-37 years range, indicating a predominantly mid-career faculty population. Educational qualifications

demonstrate that 60% hold bachelor's degrees, while only 10% possess PhDs, highlighting potential gaps in advanced academic training among the teaching staff. These demographic factors provide essential context for interpreting the study's findings on ICT adoption patterns.

Knowledge Levels, Critical Gaps Emerged in Specialised Applications:

Table 2: Tutors' ICT Knowledge (N=80)

Application	Sufficient	Fair	No Knowledge
Graphic Design	2 (2.50%)	13 (16.25%)	65 (81.25%)
Statistical Tools	2 (2.50%)	7 (8.75%)	71 (88.75%)

The knowledge assessment table above reveals significant disparities in tutors' technological competencies. While 81.25% of tutors lack any capability in graphic design applications, only 2.5% demonstrate sufficient skills - a critical gap for creating visual teaching materials. The table further shows that 88.75% of tutors have no knowledge of statistical software, which is particularly concerning for evidence-based health education. In contrast,

basic digital literacy appears stronger, with only 21.25% lacking word processing skills. These findings suggest that while tutors possess foundational computer skills, they require targeted training in specialised educational applications.

Attitudinal Patterns

Despite knowledge gaps, 72.5% agreed that ICT enhances teaching (Table 3):

Table 3: Attitudes towards ICT Integration (N=80)

Statement	Agree/Strongly Agree	Neutral	Disagree
ICT improves lesson delivery	57 (71.25%)	19 (23.75%)	4 (5.00%)
Technical problems hinder usage	3 (3.75%)	17 (21.25%)	60 (75.00%)

This table captures tutors' perceptions about technology use in teaching. A strong majority (71.25%) believes ICT enhances lesson delivery, indicating widespread recognition of its educational value. However, 75% disagree that technical problems hinder usage, which contrasts with the low actual implementation rates shown in Table 4. The

neutral responses (21.25%) regarding technical challenges suggest some ambivalence, possibly reflecting intermittent rather than consistent technological barriers. These attitudinal measures provide important insights into the psychological readiness for digital transformation at UIAHMS.

Usage Practices

ICT applications remained limited to basic functions:

Table 4: Frequency of ICT Use (N=80)

Activity	Often	Rarely	Never
Lesson preparation	19 (23.75%)	47 (58.75%)	14 (17.50%)
Student assessments	11 (13.75%)	35 (43.75%)	34 (42.50%)

The practice patterns table above demonstrates a clear hierarchy of technology adoption. While 58.75% of tutors occasionally use ICT for lesson preparation, only 23.75% do so regularly. Most strikingly, 42.5% never employ technology for student assessments, maintaining entirely manual evaluation systems. The data reveal that ICT serves primarily as a supplementary tool (for material access) rather than a transformative pedagogical asset. This implementation gap between basic and advanced uses mirrors findings from comparable institutions in resource-constrained settings.

DISCUSSION

The findings of this study present a nuanced understanding of ICT integration among tutors at UIAHMS, revealing both progress and persistent challenges.

Knowledge of Tutors towards ICT in Teaching

The study revealed that while the majority of tutors (95%) had received some form of ICT training, significant gaps persisted in their practical competencies. Specifically, 81.25% lacked proficiency in graphic applications, and 88.75% reported no knowledge of statistical software. This disparity suggests that current training programs may not adequately address the advanced digital skills necessary for modern pedagogical practices.

These findings align with Mailizar and Fan's (2020) study in Indonesia, where tutors demonstrated stronger familiarity with basic tools like word processors but struggled with specialised applications. This pattern of basic proficiency overshadowing advanced skills is further corroborated by Gondwe's (2022) research in

Malawi, which highlighted a similar reliance on fundamental digital tools among teacher educators. Furthermore, our results find a parallel in the work of Buabeng-Andoh (2021) in Ghana, who identified that teacher training often overlooks advanced technical skills in favour of basic digital literacy, creating a ceiling effect on integration potential. The high percentage of tutors with no knowledge of statistical software (88.75%) is particularly concerning, given its importance in health professions education for data analysis and research. This gap may stem from the fact that most training programs focus on fundamental ICT literacy rather than discipline-specific applications.

Furthermore, the reliance on self-directed learning reported by 47.8% of tutors in similar Ugandan institutions, as noted by Twebaze (2023), may contribute to these deficiencies. Informal learning often lacks structured assessments and practical components, leading to superficial rather than functional knowledge. The findings underscore the need for targeted professional development programs that move beyond basic digital literacy to encompass advanced pedagogical applications.

Attitudes of Tutors towards ICT in Teaching

Despite knowledge gaps, the study found that 86.25% of tutors held positive attitudes toward ICT integration. A significant majority (71.25%) agreed that ICT enhances teaching effectiveness, while 75% disagreed that technical problems were a major barrier. These results mirror Ramadass and Shah's (2022) findings in Malaysia, where educators recognised ICT's potential despite infrastructural challenges.

However, the positive attitudes contrast with actual usage patterns, suggesting that tutors' enthusiasm does not always translate into classroom practice. This disconnect may be attributed to several factors, including inadequate institutional support, unreliable infrastructure, or a lack of confidence in applying ICT skills. The Technology Acceptance Model (Davis, 1989) posits that perceived usefulness and ease of use influence adoption, but external constraints, such as frequent power outages or insufficient technical support, can hinder implementation even when attitudes are favourable. This phenomenon gap between positive perception and practical application is not unique to Uganda but is rather a common theme in resource-constrained environments, as noted by Mustafa et al. (2024) in their systematic review of rural schools, which found that positive attitudes often fail to materialise into practice without adequate structural and technical support systems.

Notably, tutors' perceptions varied depending on the context of ICT use. While many supported technologies for lesson preparation (72.5%), fewer were confident in its application for interactive teaching or assessments. This selective acceptance aligns with Kithuci et al.'s (2022) study in Kenya, where faculty favoured ICT for administrative tasks but remained hesitant in classroom settings. Addressing these contextual barriers requires not only attitude change campaigns but also systemic improvements in institutional support.

Practices of Tutors in Using ICT in Teaching

The study found a stark contrast between tutors' theoretical knowledge and their actual ICT usage. While 83.75% reported using ICT to access teaching materials, only 27.5% employed it for interactive teaching, and a mere 13.75% utilised digital tools for student assessments. This pattern reflects Chukwu's (2016) observations in Nigeria, where nursing educators primarily used ICT for communication rather than pedagogical innovation.

The low adoption of ICT in assessments is particularly noteworthy, as it limits opportunities for competency-based evaluations recommended by WHO (2013). Tutors cited challenges such as limited time (58.75%), lack of institutional policies (42.50%), and unreliable internet connectivity (68.75%) as key barriers. These findings resonate with Kuzembayeva's (2022) study in Kazakhstan, where educators expressed willingness to adopt technology but faced logistical constraints that impeded consistent usage. The predominant use of ICT for accessing materials rather than interactive pedagogy mirrors findings from Ramadass and Shah's (2022) study in Malaysia, suggesting a global challenge in moving from passive to active technological integration in teaching. This recurring theme across diverse contexts underscores that the challenge is systemic. As noted by UNESCO (2023), the transition from using ICT for passive content delivery to active, pedagogical application remains a significant hurdle in many developing educational systems.

The preference for traditional assessment methods may also stem from a lack of training in digital evaluation tools. Without structured professional development, tutors default to familiar paper-based systems, even when digital alternatives are available. This highlights the need for curriculum reforms that mandate gradual ICT integration, coupled with ongoing mentorship to build tutors' confidence in using technology for diverse teaching functions.

CONCLUSIONS

In conclusion, this study highlights a critical disconnect between tutors' positive attitudes toward ICT and their actual classroom practices, revealing that while most recognise its pedagogical value, significant gaps in advanced digital skills and institutional support hinder effective implementation. The findings underscore the urgent need for targeted training programs that move beyond basic literacy to address discipline-specific applications, coupled with robust institutional

policies to ensure reliable infrastructure and technical assistance. By addressing these barriers, UIAHMS can foster meaningful ICT integration that enhances teaching quality and aligns with global standards in health professions education. Ultimately, bridging this gap requires a concerted effort from individual tutors, institutional leadership, and national policymakers to create an enabling environment for sustainable digital transformation in allied health training.

RECOMMENDATIONS

The study recommends the following:

For UIAHMS Administration: Establish a phased ICT integration program combining mandatory pedagogical technology training (with discipline-specific modules on graphic applications and statistical tools), provision of reliable technical support through a dedicated helpdesk, and institutional policy reforms that incentivise ICT use through teaching evaluations and resource allocation.

For Uganda's Ministry of Education & Sports: Develop and fund a national digital competency framework for health tutors, incorporating: (a) standardised ICT proficiency benchmarks, (b) infrastructure grants conditional on demonstrated usage, and (c) partnerships with tech firms to provide localised training solutions - while requiring quarterly impact assessments from beneficiary institutions like UIAHMS.

For Tutor Training Institutions (e.g., Health Tutors' College): Restructure teacher education curricula to embed ICT integration across all methodology courses, including simulated classroom technology scenarios, mandatory micro-teaching sessions using digital tools, and supervised practicum requirements demonstrating competency in at least three pedagogical applications relevant to allied health education.

Limitations

The limitations of this study, including its single-institution focus and self-reported data, suggest avenues for future research. Multi-site studies incorporating classroom observations could provide deeper insights into actual ICT usage patterns. Longitudinal research tracking tutors' progression from training to implementation would help identify critical transition points where support is most needed. Despite these limitations, the study offers actionable insights for UIAHMS and similar institutions navigating the complexities of digital transformation in health education.

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