
A REVIEW OF STRATEGIES ON ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN ENHANCING EDUCATIONAL DELIVERY AND STUDENT OUTCOMES IN MALAWIAN PRIVATE UNIVERSITIES

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ABSTRACT

This study examined ICT adoption strategies and their influence on educational delivery and student outcomes in Malawian Private Universities. Guided by the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) theory, the research adopted a descriptive design with a mixed methods approach. Data were collected from 36 respondents (31 students and 5 lecturers) using structured questionnaires, with semi-structured interviews conducted with ICT staff and administrators. The instrument demonstrated excellent reliability (Cronbach's $\alpha = 0.927$).

Findings revealed positive perceptions of ICT adoption, with high mean scores for improved learning experiences ($M=4.250$), enhanced communication ($M=4.083$), and learning flexibility ($M=4.139$). Institutional factors including internet connectivity, ICT resources, technical support, and training, alongside social factors such as lecturer encouragement and peer influence, were identified as key determinants of ICT adoption. Pearson correlation established a strong positive relationship between ICT adoption and educational delivery ($r=0.867$, $p<0.01$). Regression analysis demonstrated that ICT adoption significantly predicted educational delivery ($\beta=0.867$, $p<0.001$), accounting for 75.1% of the variation ($R^2=0.751$). The study concludes that ICT adoption significantly enhances educational delivery and recommends strengthening ICT infrastructure, improving internet connectivity and affordability, enhancing training and capacity building, strengthening technical support, and promoting a supportive ICT culture.

KEYWORDS: *ICT Adoption, Educational Delivery, Student Outcomes, Private Universities, Malawi, Technology Acceptance Model, Diffusion of Innovation*

1. INTRODUCTION

Across the world, universities are increasingly relying on information and communication technologies (ICT) to support teaching, learning, and academic administration. Students now routinely access learning materials online, interact with lecturers through digital platforms, and participate in virtual or blended classes. These developments reflect the growing recognition that ICT is no longer a supplementary tool but a core component of modern higher education systems (UNESCO, 2021). As higher education institutions expand and diversify, ICT has become central to improving access, flexibility, and efficiency in educational delivery.

In Africa, ICT adoption in higher education has grown, particularly with improvements in internet connectivity and mobile technologies. However, progress has been uneven, with many institutions facing challenges related to limited infrastructure, high connectivity costs, and inadequate digital skills among staff and students (World Bank, 2022). Malawi reflects many of these regional challenges. Although the use of ICT in higher education has increased, internet access remains limited and costly, and institutions often operate with constrained ICT resources (MACRA, 2023).

Private universities in Lilongwe operate within this evolving digital environment. While some institutions have made significant progress in adopting ICT for teaching and learning, others continue to face challenges such as inadequate infrastructure, limited technical support, and inconsistent ICT policy implementation. Understanding ICT adoption strategies within private universities is therefore critical, as these strategies directly influence the quality and effectiveness of higher education delivery. Despite the growing importance of ICT in Malawi's private higher education sector, limited research has focused specifically on how institutional adoption strategies shape teaching practices and student outcomes. This study seeks to address this gap.

2. OBJECTIVE

To examine the influence of ICT adoption strategies on educational delivery in Malawi's private higher education sector.

3. LITERATURE REVIEW

3.1 Theoretical Framework

The theoretical framework for this study draws on two well-established theories: the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) Theory. Together, these theories provide a comprehensive foundation for understanding ICT adoption from both individual cognitive perspectives and broader social and organizational dynamics.

Technology Acceptance Model: Developed by Davis (1989), TAM proposes that the intention to use a technology is primarily determined by two key beliefs: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which an individual believes that using a specific technology will enhance their performance, while perceived ease of use refers to the extent to which an individual believes that using the technology will be free from effort. These core beliefs influence a user's attitude toward technology, which in turn shapes their behavioral intention to use it, eventually resulting in actual use (Venkatesh & Bala, 2008; Teo, 2011).

Diffusion of Innovation Theory: Originally developed by Rogers (2003), DOI explains how innovations are communicated through specific channels over time among members of a social system. According to DOI, the adoption of an innovation is influenced by characteristics such as relative advantage, compatibility, complexity, and observability. DOI also highlights the importance of the social environment and communication patterns, recognizing that individuals often look to peers, opinion leaders, and early adopters when deciding whether to embrace a new technology (Rogers, 2003; Greenhalgh et al., 2004).

3.2 Empirical Literature Review

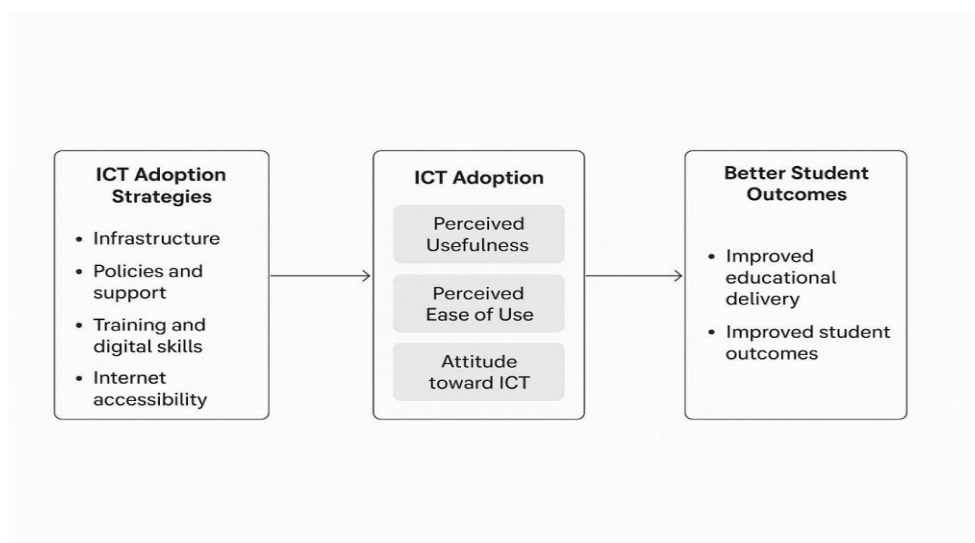
Global Evidence: Internationally, ICT has become an essential component of higher education. Johnson and Aragon (2021) found that ICT significantly enhances student engagement, encourages flexibility, self-paced learning, and improves overall academic experiences. Smith and Lee (2023) reported that advanced e-learning platforms contributed to higher academic achievement, improved motivation, and more interactive learning among university students.

African Evidence: Across Africa, universities are gradually embracing digital technologies, although progress is uneven. Kihara et al. (2020) found that inadequate lecturer training and unreliable internet connectivity were among the most common obstacles to effective ICT adoption. Fabian et al. (2023) reported persistent challenges including limited access to ICT equipment, low digital literacy, and financial constraints. Despite these challenges, UNESCO (2021) highlights Rwanda's national ICT strategy as a successful model of integration.

Malawian Evidence: Research on ICT use in Malawi's higher education shows that internet connectivity, high data costs, and limited ICT infrastructure remain significant barriers to effective digital learning (Gama, Chawinga & Zozie, 2022). A World Bank (2022) report highlighted that, although the COVID-19 pandemic accelerated interest in digital education, many institutions still lack fully functional learning management systems and sufficient digital infrastructure.

3.3 Conceptual Framework

The conceptual framework proposes that strong ICT adoption strategies positively influence students' and lecturers' perceptions of usefulness and ease of use. When users perceive ICT tools as beneficial and easy to navigate, they are more likely to develop positive attitudes toward adopting these technologies, which increases actual usage. Higher adoption levels subsequently lead to improved educational delivery, reflected in more interactive teaching practices, timely feedback, and enhanced access to digital resources. Ultimately, enhanced educational delivery translates into better student outcomes, including improved academic performance, increased engagement, higher satisfaction with learning experiences, and stronger digital literacy skills.



4. RESEARCH METHODOLOGY

4.1 Research Design

The study adopted a descriptive research design supported by a mixed methods approach. The descriptive design was appropriate because the study aimed to explore and describe the current ICT adoption strategies without altering the existing institutional environment.

(Creswell, 2018). A mixed methods approach was used to capture both quantitative and qualitative dimensions of ICT adoption, enabling data triangulation and enhancing credibility.

4.2 Study Area and Target Population

The research was conducted at a private higher education institution in Lilongwe, Malawi. The institution was selected because its strong reliance on digital platforms, including virtual learning environments, online submission portals, and virtual classrooms, makes it a suitable case for examining ICT adoption strategies and their outcomes in Malawi's private higher education sector. The institution represents a context where technology integration is extensive, yet limited research has explored how ICT adoption strategies are implemented and experienced in private higher education institutions within the country.

The target population for this study included students enrolled in undergraduate and postgraduate programs, lecturers who teach using digital tools and virtual learning environments, ICT support staff, and academic administrators. This population was considered ideal because each group interacted with ICT at different operational levels, and their combined perspectives provided a holistic understanding of ICT adoption processes, challenges, and outcomes within the university.

4.3 Sampling Method and Sample Size

Purposive sampling was used to select lecturers, ICT support staff, and academic administrators. Simple random sampling was applied to student participants to minimize selection bias. Using Yamane's (1967) formula with a 95% confidence level, the sample size was 36 respondents (31 students and 5 lecturers). This sample was justified on the basis of statistical adequacy and practical feasibility.

4.4 Data Collection Methods

Structured questionnaires were administered to students and lecturers using an online survey platform. The questionnaire consisted of closed-ended questions and Likert-scale items measuring perceived usefulness, perceived ease of use, availability of ICT resources, digital skills, system reliability, and influence of ICT on teaching and learning. Semi-structured interviews were conducted with ICT support staff and academic administrators to obtain in-depth qualitative insights.

4.5 Data Analysis

Quantitative data was analyzed using SPSS Version 21, employing descriptive statistics (frequencies, percentages, means, and standard deviations), Pearson correlation analysis, and simple linear regression analysis. Qualitative data from interviews was analyzed using thematic analysis following Braun and Clarke's (2013) six-step approach.

4.6 Ethical Considerations

Ethical principles were strictly observed throughout the study. Formal approval was obtained from the authorities of the selected universities. Informed consent was obtained from each respondent. Participants were assured of voluntary participation and their right to withdraw, confidentiality was maintained, and data was stored securely with restricted access.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Demographic Characteristics

CHARACTERISTIC	CATEGORY	FREQUENCY	PERCENTAGE
Gender	Female	16	44.40%
	Male	20	55.60%
Age Group	18-25	5	13.90%
	26-35	14	38.90%
	36-45	10	27.80%
	46 and above	7	19.40%
Status	Lecturer	5	13.90%
	Student	31	86.10%
Level of Study	Postgraduate	21	58.30%
	Undergraduate	15	41.70%
ICT Experience	Less than 1 year	5	13.90%
	1-3 years	14	38.90%
	4-6 years	6	16.70%
	More than 6 years	11	30.60%

5.2 Reliability Analysis

Cronbach's Alpha analysis yielded a coefficient of **0.927**, indicating excellent internal consistency and reliability of the questionnaire instrument.

5.3 Descriptive Statistics

STATEMENT	MEAN	STD. DEVIATION
ICT makes learning more interesting	4.25	0.8742
ICT helps users complete academic tasks more quickly	4.167	1.3202
ICT supports flexible learning (anytime, anywhere)	4.139	1.2684
ICT improves communication between students and lecturers	4.083	1.2956
ICT improves teaching and learning processes	4.028	1.3413
I can use ICT systems without assistance	4.111	1.0359
I enjoy using ICT tools for academic work	3.889	0.9495
I prefer ICT-based learning over traditional methods	3.889	0.8545
I feel confident when using ICT systems	3.75	1.1052
The Virtual Learning Environment (VLE) is user-friendly	3.722	1.1616
Learning how to use ICT tools is easy for me	3.528	1.1335
ICT systems used at the university are easy to use	3.472	0.9706

5.4 Factors Influencing ICT Adoption

FACTOR	MEAN	STD. DEVIATION
Fellow students encourage ICT use	4.056	0.7149
ICT use is common among students and lecturers	4.028	0.8447
Limited access to ICT facilities	3.861	1.2684
Lecturers encourage ICT use	3.861	0.99
Lack of ICT skills	3.806	1.2833
Poor internet connectivity	3.667	1.1212
University provides ICT training	3.472	0.9407
Technical support available	3.417	0.9673
University provides adequate ICT resources	3.139	0.9305
Internet connectivity is reliable	3.111	0.9189
Internet costs are affordable	2.833	1.0556

6. FINDINGS

6.1 ICT Adoption Strategies in Malawi's Private Higher Education

The findings indicate that respondents generally held positive perceptions regarding ICT adoption in Malawi's private higher education sector, as evidenced by mean scores above 3.0 across all statements. The highest-rated statement was "ICT makes learning more interesting" (Mean = 4.250, SD = 0.8742), suggesting that respondents strongly perceived ICT as enhancing engagement in the learning process. Similarly, respondents agreed that ICT helps users complete academic tasks more quickly (Mean = 4.167, SD = 1.3202), ICT supports flexible learning (Mean = 4.139, SD = 1.2684), and ICT improves communication between students and lecturers (Mean = 4.083, SD = 1.2956).

The results further show that respondents felt capable of using ICT independently, as reflected by the statement "I can use ICT systems without assistance" (Mean = 4.111, SD = 1.0359). However, relatively lower mean scores were recorded for "ICT systems used at the university are easy to use" (Mean = 3.472, SD = 0.9706) and "Learning how to use ICT tools is easy for me" (Mean = 3.528, SD = 1.1335), indicating that some respondents experienced challenges in navigating ICT systems. These findings support the propositions of the Technology Acceptance Model (TAM), which posits that perceived usefulness and perceived ease of use influence the acceptance and adoption of technology.

6.2 Factors Influencing ICT Adoption

Both institutional and social factors were identified as influencing ICT adoption. Respondents acknowledged challenges including limited access to ICT facilities (Mean = 3.861), poor internet connectivity (Mean = 3.667), and lack of ICT skills (Mean = 3.806). Institutional factors such as training opportunities (Mean = 3.472) and technical support (Mean = 3.417)

received moderate agreement, while internet affordability received the lowest mean score (Mean = 2.833). Social factors were found to play a significant role, with respondents agreeing that lecturers encourage ICT use (Mean = 3.861), fellow students encourage ICT usage (Mean = 4.056), and ICT use is common among the university community (Mean = 4.028). These findings align with the Diffusion of Innovation (DOI) Theory, which emphasizes the importance of social systems and organizational support in influencing adoption of innovations.

6.3 Relationship between ICT Adoption and Educational Delivery

Pearson Correlation Analysis:

The findings revealed a strong positive relationship between ICT adoption and educational delivery ($r = 0.867$, $p = 0.000$). Since the p-value is less than 0.05, the relationship is statistically significant. This implies that increased adoption of ICT is associated with improved educational delivery in Malawi's private higher education sector. The correlation coefficient of 0.867 indicates a very strong positive association between the two variables.

The results are presented in the table below:

		ICT Adoption	Educational Delivery
ICT Adoption	Pearson Correlation	1	0.867**
	Sig. (2-tailed)		0
	N	36	36
Educational Delivery	Pearson Correlation	0.867**	1
	Sig. (2-tailed)	0	
	N	36	36

Regression Analysis

A simple linear regression analysis was conducted to determine the influence of ICT adoption on educational delivery. The results are presented in Tables below:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.867 ^a	0.751	0.744	0.61464
a. Predictors: (Constant), ICT Adoption				

The regression results show a strong positive relationship between ICT adoption and educational delivery ($R = 0.867$). The coefficient of determination ($R^2 = 0.751$) indicates that ICT adoption accounts for 75.1% of the variation in educational delivery. This implies that ICT adoption is a substantial predictor of educational delivery within Malawi's private higher education sector.

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	38.753	1	38.753	102.579	.000 ^b
	Residual	12.845	34	0.378		
	Total	51.597	35			
a. Dependent Variable: Educational Delivery						
b. Predictors: (Constant), ICT Adoption						

The ANOVA results revealed that the regression model was statistically significant, $F(1,34) = 102.579$, $p < 0.001$. Since the significance value is less than 0.05, the model adequately explains the relationship between ICT adoption and educational delivery and can therefore be used for prediction purposes.

Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	-0.88	0.495		-1.776	0.085
(Constant)					
ICT Adoption	1.266	0.125	0.867	10.128	0

The regression coefficient for ICT adoption was positive and statistically significant ($\beta = 0.867$, $t = 10.128$, $p < 0.001$). This finding indicates that higher levels of ICT adoption are associated with improved educational delivery in Malawi's private higher education sector.

The regression equation is:

$$\text{Educational Delivery} = -0.880 + 1.266(\text{ICT Adoption})$$

This equation indicates that a one-unit increase in ICT adoption is associated with an increase of approximately 1.266 units in educational delivery, holding all other factors constant.

6.4 DISCUSSION OF FINDINGS

The findings revealed that respondents generally held positive perceptions regarding ICT adoption and use in teaching and learning. These results are consistent with previous studies which reported that ICT enhances learning effectiveness, communication, and access to educational resources (Al-Rahmi et al., 2020; Yusuf & Balogun, 2011). The results support the Technology Acceptance Model (Davis, 1989), demonstrating that perceived usefulness and perceived ease of use are key determinants of technology adoption.

The identification of institutional and social factors as influencers of ICT adoption aligns with the Diffusion of Innovation Theory (Rogers, 2003), which emphasizes the importance of organizational support and social systems in facilitating adoption and diffusion of innovations. Similar observations were reported by Tarhini et al. (2015), who found that

institutional support and social influence significantly affect technology adoption in higher education settings.

The strong positive relationship between ICT adoption and educational delivery ($r = 0.867$) is consistent with studies by Alharbi and Drew (2014) and Al-Rahmi et al. (2020). They found significant positive relationships between technology adoption and educational performance outcomes. The regression analysis establishing that ICT adoption explains 75.1% of the variation in educational delivery demonstrates that ICT adoption is a major contributor to educational effectiveness in Malawian private universities. These results are consistent with previous studies which concluded that increased utilization of ICT improves educational delivery by enhancing access to information, promoting interactive learning, and supporting efficient communication (Kirkwood & Price, 2014; Al-Rahmi et al., 2020).

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

This study examined ICT adoption strategies and their influence on educational delivery and student outcomes in Malawian private higher education institutions. The findings revealed that ICT adoption contributes significantly to educational delivery at University of Hebron. Respondents generally held positive perceptions regarding the use of ICT in teaching and learning activities. Both institutional and social factors were identified as influencing ICT adoption. The study further established that ICT adoption has a strong positive and statistically significant influence on educational delivery ($r = 0.867$, $p < 0.01$). Regression analysis demonstrated that ICT adoption significantly predicts educational delivery ($\beta = 0.867$, $p < 0.001$), accounting for 75.1% of the variation in educational delivery outcomes ($R^2 = 0.751$).

The results confirm that effective adoption and utilization of ICT enhance learning flexibility, communication, access to educational resources, and overall educational effectiveness. The findings support the applicability of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) theory in explaining ICT adoption in private higher education settings in Malawi. The study contributes to the limited empirical evidence on ICT adoption strategies in private universities in Malawi and provides practical insights for policymakers, university administrators, educators, and students seeking to optimize ICT-enabled learning environments.

7.2 Recommendations

Strengthen ICT Infrastructure

The study established that ICT adoption significantly improves educational delivery. Private universities in Malawi should continue investing in ICT infrastructure, including computer facilities, learning management systems, and digital learning resources, to ensure effective teaching and learning.

Improve Internet Connectivity and Affordability

The findings revealed that internet connectivity and internet costs affect ICT utilization. The universities should work towards improving internet reliability and explore strategies that can reduce internet-related costs for students and lecturers to enhance access to online learning resources.

Enhance ICT Training and Capacity Building

The study found that ICT skills influence technology adoption. The universities should regularly provide ICT training programmes and workshops to strengthen the digital competencies of both students and lecturers and improve effective utilization of ICT systems.

Strengthen Technical Support Services

The findings revealed that technical support contributes to effective ICT usage. The Universities should enhance technical support services to ensure that users receive timely assistance whenever they encounter ICT-related challenges.

7.5 Promote a Supportive ICT Culture

The study established that social influence positively affects ICT adoption. University management and lecturers should continue encouraging the use of ICT in academic activities and create an environment that promotes digital learning and innovation.

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