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Integrating Information and Communications Technology in Teaching: Perceptions from Teachers in Malawi

Tumbikani Manjawira Msowoya *

Abstract: *The integration of ICT in teaching and learning has taken center stage across the world. Many countries in developed and developing countries alike have adopted this integration. The integration of ICT is however dependent on the perceptions of teachers. This study aimed to find out the perception of teachers on the use of ICT in teaching and learning. Findings from this study reveal that teachers in Malawi have a negative perception in the integration of ICT in teaching and learning. The study also reveals that there are personal attributes that influence the integration of ICT in education.*

Keywords: Information and communication technology, integration, self-efficacy, computer anxiety, subjective norm.

Introduction

The past two decades have witnessed considerable progress in technological related activities. One of the areas that has substantially grown is Information and Communication Technology (ICT). The fast advances of ICT have correspondingly modified many systems including the education sector. This has transformed the teaching and learning into a flexible activity. Despite the challenges associated with ICT integration in education, ICT has provided adaptability in teaching and learning. As such, there has been an increasing demand on education institutions to use ICT in the teaching and learning process.

It is posited that the teaching and learning environments in education have tremendously been changed (Pajo & Wallace, 2001) attributing that the use of ICT in education, unlike the traditional means, is offering powerful learning environments that can transform the learning and teaching process (Volman & van Eck, 2001). Further, research shows that ICT improves the teaching-learning process by making it more fun by bringing more materials and resources for classroom interaction than the traditional methods.

In as far as education is concerned, ICT is considered a significant means to promote new methods of instruction. It is not unexpected therefore to realize that most education systems have adopted this new innovation in technology which has reversed the teaching process from teacher centered to learner centered. In trying to cope with the ever-growing

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trends in technology, the Malawi Government incorporated ICT as a priority area in its National Education Policy. The policy realizes the need to improve the use of ICT in its education system from primary to tertiary education.

So far, this use of ICT has been instrumental only in some tertiary institutions. However, since the Covid-19 outbreak across the world, there has been great demand to use ICT in accessing educational materials across education institutions in tertiary, secondary and primary schools alike. Despite this notable interest of using ICT as a tool for improving education, a number of studies have shown that the effective integration of ICT in schools is not only a result of having proper infrastructure, but also depends on the teacher's familiarity and ability with the information technology learning environment (Sangrà & González-Sanmamed, 2010). It is a requirement that teachers know exactly how ICT is used as a teaching tool, for their own purposes and to help students to use them.

Although Malawi is one of the countries that adopted the Sustainable Development Goals in education, which in part lays the foundation for the Education for All 2030 Declaration, and despite introducing the requirement for ICT in education and prioritizing the same in form of policy formulation in 2013, (National Education Policy, 2013), no study has been done to evaluate the progress on use of ICT in the education sector among the various stakeholders. This study therefore aimed to find out how teachers perceive the integration of ICT in education and also attempts to provide an empirical foundation for technological interventions in education. Findings from this study will consequently reveal the gap that is there between the guidelines in teacher education and that being practiced.

Integration of ICT in Teaching

From a wide range of perspectives in the literature, a number of factors that shape teachers' perceptions towards use of ICT have been discussed. Summarily, these factors have been grouped according to the paradigm from which they are constructed. This grouping has mostly adopted their constructs from a model by Davis (1989) which explains and predicts adoption behavior of technology among different stakeholders. It is by modifying Davis' model where some constructs used to identify factors of perception influencing adoption of technology are created. These factors include computer self-efficacy, subjective norm, computer anxiety, job relevance, perceived enjoyment, and perceived experience.

Computer Self-efficacy

Shen and Eder (2009) defines self-efficacy as a confidence by a person on his or her ability to complete a particular job by use of a computer. Studies have revealed that a person with high computer self-efficacy believes that he or she will be effective in using ICT and the one with low self-efficacy believes will face difficulties using ICT on his or her own. Owing to this, people having low computer self-efficacy are said to be inclined to avoid

using computers while those with advanced computer self-efficacy will tend to use them more (Igbaria & Iivari, 1995).

Subjective Norm

Subjective norm is how people view the ideas of other people about specific behaviour. This is a custom which comes from social pressure, influencing a person to behave in a particular manner such as to conform to those people's views. The norm considers a person's perception regarding to what most people who are important to that person think the person must do or must not (Venkatesh, Morris, Davis, & Davis, 2003). Subjective norm as a social factor significantly influences the use of ICT and use behaviors of people (Saengchaia, Pattanapongthornb, & Jermisittiparsertc, 2019). In a study conducted by Ursavaş, Yalçın, and Bakır (2019) which aimed to investigate the effect of subjective norms on pre-service and in-service teachers, it was revealed that subjective norm massively affects teachers' intent to use technology in pre-service teachers. However, it was observed that the same effect was smaller in in-service teachers.

Computer Anxiety

Computer anxiety refers to a person's feeling of uneasiness or stress when that person is faced with the impending possibility to use computers (Cambre & Cook, 1985). It is the tendency of an individual to experience some levels of unease over his or her imminent use of a computer (G. S. Howard, 1986). In a study regarding students' perceptions towards online learning system, (Saadé & Kira, 2006) reveals that computer anxiety has no direct impact on the perceived usefulness in using online learning system. However, the study shows that computer anxiety has indirect influence through the perceived ease of use on the students' intention of online learning system. Ndubisi (2004) investigates the serious causes that affect students' intent to adopt technology. Among the external variables that were proposed, findings indicate that computer anxiety contributes significantly and predicts more than 20% of variation in perceived behavioral control. These findings also reveal that students with great level of computer anxiety have less perceived behavioral control which would eventually influence the behavioral intention to use technology.

Perceived Enjoyment

Davis, Bagozzi, and Warshaw (1992) defines enjoyment as the degree to which using technology is observed to be enjoyable in its own right apart from any performance consequences that may be anticipated. As an intrinsic motivation, perceived enjoyment underscores the usage process and reflects the pleasure and enjoyment associated with using a particular system. Several studies have proposed that perceived enjoyment is able to considerably affect the intent to use a particular system in question. The rationale is that individuals who experience pleasure or enjoyment from using a system are expected to have an intention to use it than others (Davis et al., 1992). This hypothesis has been proved

with a lot of empirical support. In a study to find out the motivators of students' intention to use a new learning medium known as internet-based learning medium, [Lee, Cheung, and Chen \(2005\)](#) discloses that perceived enjoyment, (which was tested alongside perceived ease of use) as an external factor, posited a highly significant impact on students' intention to use internet based learning medium. A study assessed individual motivation toward the acceptance of information system. The study defines that most of internet users apart from being motivated by their insight toward internet efficacy in helping their tasks, are using it just for enjoyment. It can therefore be deduced that it would be easier for them that those systems will have perceived usefulness and perceived ease of use. As such, it results in causing enjoyment if the user uses those systems ([Venkatesh et al., 2003](#)).

Computer Experience

[Smith, Caputi, Crittenden, Jayasuriya, and Rawstorne \(1999\)](#) defines computer experience as the expanse and type of computer skills that a person gains over time. [Purnomo and Lee \(2013\)](#) proposes that people that tend to possess advanced computer experience, such as those using computers, internet and email and saving and locating files, are expected to have more positive feelings towards the ease of use and usefulness of technology. Individuals with higher computer-related skills are more likely to have more positive feelings about the usage of any online/distance learning tool ([Abdullah & Ward, 2016](#)).

Job Relevance

Job relevance, according to [Venkatesh et al. \(2003\)](#) is a person's perception concerning the degree to which the target system is applicable to his or her job. It is identified as a function of the significance within a person's job of the set of jobs the system is capable of supporting. Studies disclose that most users of technology possess different knowledge about their job situation, which later, they can use as a foundation for determining the type of jobs that can be performed with a particular system ([Kieras & Polson, 1999](#); [Polson, 1987](#)). The existence of well-defined knowledge structures regarding important job goals must be supported by research from personnel psychology ([Roberson, 1989](#)). Job relevance is regarded as a cognitive judgment which is almost separate from social influence as it directly influences perceived usefulness of a system.

Influence of Personal Attributes on ICT Use

Successful integration of ICT in teaching and learning has been hinged upon so many influences. One of the prominent influences is personal attributes. [Buabeng-Andoh \(2012\)](#) reveals that some personal characteristics in teachers contribute much to how those teachers implement and use ICT in the end. These features include age, gender, educational qualification and teaching experience ([Buabeng-Andoh, 2012](#)), school location ([Wang, 2013](#)), and teaching subjects ([Lalitha & Prasad, 2014](#)).

The experience of teachers in teaching plays part in use of ICT teaching. [Lau and Sim \(2008\)](#) reveals that teachers with more experience in the profession have positive attitudes

towards use of ICT in teaching. However, [Baek, Jung, and Kim \(2008\)](#) argues that it is the other way round. In their study, he shows that older and more experienced teachers are in fact reluctant to use ICT in the classrooms as compared to non-experienced and young teachers. [Afshari, Bakar, Luan, Samah, and Fooi \(2009\)](#) agrees that younger teachers with fewer years of experience are likely to use computers more than teachers with more years of experience. However, differing to the two views, [\(Wachiuri, 2015\)](#) argues that there is no relationship between teacher's work experience and their use of ICT in teaching.

Secondly is gender. Studies have shown that women have lower self confidence in the use of computers as a result of not having good attitude towards learning ICT in the early stages ([Volman & van Eck, 2001](#)). Some of these studies include [Whitley Jr \(1997\)](#), whose study on gender differences in computer-related attitudes shows that gender differences in computer-related behaviors are insignificant and do not differ as a function of study population. [Schumacher and Morahan-Martin \(2001\)](#) explains that males are more experienced than females with computer programming and games, and concludes that this greater experience may enhance the practical superiority of males with computers compared with females.

Further, there is a robust supposition that the nature of the subject being taught has influence on the use of ICT. It is recognized that science and technical subjects are likely to be taught with the use of ICT than subjects like languages and social sciences. While [S. K. Howard, Chan, and Caputi \(2015\)](#) explains that science subjects are taught with a higher frequency than languages, [\(Balanskat, 2006\)](#) on the other hand shows that there is a higher impact in language as a result of ICT than it is in sciences. However, [Basargekar and Singhavi \(2017\)](#) argue that there is no significant difference in ICT usage among teachers teaching different subjects.

The other attribute is school location. As far as technology access is involved, rural schools have always been on a disadvantaged side. This is so because rural based schools have less funding for educational technology than urban schools ([Wang, 2013](#)). Additionally, the infrastructure differences hinder rural schools from accessing some important facilities such as electricity and telecommunications channels ([Gulati, 2008](#)). A study in South Africa shows that most schools in the rural setting are lacking basic ICT facilities such as telephones, computer hardware as well as software ([Herselman, 2003](#)). The absence of such keys to facilities is in itself a handicap to technology integration. This access - or lack of it, plays a part in respective teachers' perception on using ICT to teach. Another study explains that urban teachers have positive attitude towards ICT integration than those in the rural. This is attributed to the facts that firstly, urban teachers feel confident about their ability to use technology; secondly, urban teachers believe that technology is an integral part of their classroom; and finally, urban teachers want more software and equipment in their classrooms.

Materials and Methods

Study Settings and Sampling

The study targeted 300 secondary school teachers in the northern education division of Malawi. The study used a simple random sampling to select teachers from various schools. From the targeted 300 respondents, 219 scripts were collected but 14 scripts were incomplete and were discarded, leaving valid 205 scripts for the analysis, which represented a 68 percent response rate.

Instrument Development and Data Collection

The study used a questionnaire. Each construct under test in this questionnaire was already tested and had approved internal consistency. The questionnaire measured (i) self-efficacy, (ii) computer experience, (iii) ICT anxiety, (iv) perceived enjoyment, (v) subjective norm and (vi) job relevance. The questionnaire used a 7 point Likert scale to rate the responses ranging from 1 (completely disagree) to 7 (completely agree). The questionnaire comprised 6 questions with 25 items (including 6 demographic items).

Validation and Pilot Study

In this study, all used research tools were already validated and published. However, the instruments were pilot tested to ensure that careful cross-cultural adaptation has been done. The questionnaire was pilot tested to 10 respondents. The questionnaire revealed an internal consistency of 0.82 (Cronbach alpha).

Data Analysis Procedures

Quantitative data was analyzed using IBM® SPSS® Statistics version 23. Preliminary analyses were conducted to prepare and clean the data. The data was then screened for precision and missing values, and each survey item was checked for normality. After data screening and normality check, descriptive statistics were calculated to examine the quantitative aspects of the data. Inferential statistical measures were conducted such as the t-test, Analysis of Variance (ANOVA) and Post hoc analyses using the Bonferroni tests.

Results

Demographic Characteristics of Participants

The combined demographic characteristics of participants in both the quantitative and qualitative study are shown in Figure 1.

Perceptions of Teachers on using ICT

Table 1 shows mean scores and standard deviations of items regarding teachers' perception to use technology. Each variable was measured on a test value of 4.0 (a median in a 7-point Likert scale). The Cronbach alpha was 0.73. Results indicate that mean scores for all items fell below the test value.

Figure 1
Demographic characteristics of participants

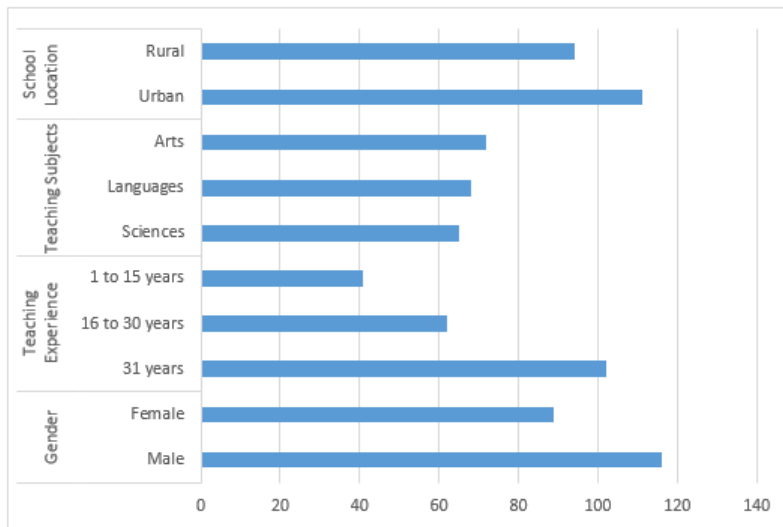


Table 1
Perception of teachers to use ICT

Item	M	SD
Computer Self-efficacy	2.92	1.42
Technology anxiety	3.78	1.46
Perceived enjoyment	3.17	1.93
Computer experience	3.56	2.13
Job relevance	1.82	0.99
Subjective norm	2.00	0.66

Further, analyses to find the normality of the data using the Shapiro-Wilk test indicated that the data was not normally distributed. The $p\text{-value} = 0.00 < 0.05$ for all variables of perception as such, further analysis was used to compare the results in terms of other demographic factors.

Influence of Gender and School Location on Perception of ICT among Teachers

Table 2 shows t-test results for gender and school location on perception of ICT among teachers. The results on gender reveal that while both male and female teachers fall below the cut-off point of positive perception, male teachers comparatively have a positive perception towards ICT than their female counterparts in all aspects except self-efficacy and anxiety. Additionally, the results show that teachers from urban areas possess a more positive perception towards the use of ICT while those from rural areas possess less positive perception.

Table 2
t-test results for gender and school location on perception of ICT among teachers. (n = 205)

Gender									School location						
Var.	Male		Female		t	df	p-val.	Urban		Rural		t	df	p-val.	
	M	SD	M	SD				M	SD	M	SD				
SE	3.36	1.31	2.35	1.36	5.38	203	0.760	2.78	1.40	3.00	1.43	-1.05	203	0.360	
ANX	4.49	1.20	2.87	1.26	9.33	203	0.430	3.34	1.53	4.02	1.37	-3.27	203	0.180	
PE	3.9	1.97	2.23	1.39	6.77	203	0.000	2.12	1.07	3.76	2.05	-6.35	203	0.000	
CE	4.21	2.11	2.71	1.84	5.33	203	0.000	2.48	1.04	4.16	2.34	-5.84	203	0.000	
JR	2.21	1.07	1.31	0.56	7.17	203	0.000	1.32	0.41	2.10	1.10	-5.82	203	0.000	
SN	2.08	0.63	1.89	0.69	1.89	203	0.000	1.31	0.41	2.10	1.10	-0.42	203	0.000	

Var. = Variable; SE= Self-Efficacy in ICT; ANX= Anxiety towards ICT; PE= Perceived enjoyment; CE = Computer Experience; JR = Job relevance; SN= Subjective Norm

Influence of Teaching Experience and Teaching Subjects on Perception of ICT among Teachers

Table 3 shows results from Analysis of variance on differences in perception as a result of work experience and teaching subjects.

Table 3
ANOVA results showing differences in perception as a result of age, work experience and teaching subjects. (n = 205)

Var	Work experience (in Years)								Teaching subjects							
	Jan-15		16 - 30		Above 30		F	p-val.	Sciences		Arts		Languages		F	p-val.
	M	SD	M	SD	M	SD			M	SD	M	SD	M	SD		
SE	3.21	1.10	3.58	1.12	2.40	1.50	16.52	<0.05	2.94	1.59	2.84	1.36	2.98	1.34	0.98	0.830
ANX	4.72	1.08	4.61	0.98	2.90	1.32	56.81	<0.05	3.74	1.56	3.81	1.39	3.79	1.45	0.11	0.950
PE	4.58	1.67	4.78	1.46	1.63	0.54	180.22	<0.05	3.04	1.85	3.01	1.59	3.45	2.25	1.14	0.320
CE	4.99	1.73	5.68	0.96	1.70	0.60	338.92	<0.05	3.47	2.05	3.59	2.03	3.62	2.31	0.09	0.910
JR	2.07	0.85	2.70	1.04	1.18	0.32	89.05	<0.05	1.96	1.25	1.70	0.86	1.80	0.81	1.21	0.300
SN	2.37	0.45	2.53	0.51	1.52	0.44	107.15	<0.05	2.25	0.72	1.78	0.54	1.98	0.64	9.06	<0.050

Var = Variable; SE= Self-Efficacy in ICT; ANX= Anxiety towards ICT; PE= Perceived enjoyment; CE = Computer Experience; JR = Job relevance; SN= Subjective Norm

The ANOVA on experience showed significant differences ($p < 0.05$) on all variables. Post-hoc analyses on the variables using the Bonferroni test indicated that: (i) Mean scores for self-efficacy showed that the 16 - 30 group was significantly higher than the 31 and above group ($MD = 1.18$, $p < 0.05$). (ii) Mean scores for ICT anxiety showed that the 1 - 15 group was significantly higher than the 31 and above group ($MD = 1.71$, $p < 0.05$).

(iii) Mean scores for perceived enjoyment showed that the 16 -30 group was significantly higher than the 31 and above group (MD = 3.15, $p < 0.05$). (iv) Mean scores for work experience showed a significant higher value on the 16 - 30 group against both the 1 - 15 group (MD = 0.69, $p < 0.05$) and the 31 and above group (MD = 3.98, $p < 0.05$). (v) Mean scores for job relevance indicated higher significant differences for the 16 - 30 group against both the 1 - 16 group (MD = 0.63, $p < 0.05$) and the 31 and above group (MD = 1.52, $p < 0.05$). (vi) Mean scores for subjective norm indicated significantly higher value for the 16 - 30 group against the 31 and above group (MD = 1.00, $p < 0.05$).

The analysis of variance on subjects taught showed significant differences ($p < 0.05$) on subjective norm [$F(2,202) = 9.05$, $p < 0.05$] while the other variables did not show any significant differences in the departments. After the post hoc analysis using the Bonferroni test on subjective norm, the mean score for the science teachers had significantly higher value than the language teachers (MD = 1.0814, $p < 0.05$) and that the arts teachers were significantly higher than languages (MD = 0.899, $p < 0.05$).

Discussion

In response to teachers' perceptions on the integration of ICT in teaching, this study has shown that there is a negative perception among secondary school teachers.

This study has revealed that comparatively, male teachers have a slightly positive perception towards ICT integration in teaching than their female counterparts in all aspects except in computer self-efficacy and computer anxiety. Unlike the findings from [Schumacher and Morahan-Martin \(2001\)](#) whose investigation in computer practices regarding gender revealed that males were more experienced than females with computer programming and games, then concluded that this greater experience may enhance the practical superiority of males with computers compared with females. This shows that despite being more experienced than females, males do still succumb to lacking confidence and feels uneasy when it comes to completing a particular task using computers in a similar way females do. This therefore, is in concurrence with the findings from [Whitley Jr \(1997\)](#) whose findings on computer related attitudes reveal that gender differences do not play a major part in as far as computer related attitudes are concerned.

Further, this study has shown that perception of teachers differs in accordance to the location of the school where the teacher is teaching. The study reveals that teachers teaching in urban schools are more inclined towards integration of ICT in teaching than those from the rural. The findings of this study are in agreement with [Clark \(2000\)](#) who found out that urban teachers have positive attitude towards ICT integration than those in the rural. Among the many attributes dividing urban schools and rural schools is the lack of funding ([Wang, 2013](#)) and availability of proper infrastructure which hinders teachers in rural schools from accessing some important facilities such as electricity which translates to the notion that it is infeasible to access basic ICT materials such as computers ([Herselman, 2003](#)). All these differences arising from geographical divergence means the teachers in the rural schools tend to avoid using computers, have no intention of enjoying using ICT and sees no relevance in using ICT in their job.

This study has also found out that when it comes to work experience, the middle

group that has a work experience of 16 years to 30 years shows some positive perception towards ICT integration than the less experienced (1 year to 15) and the very experienced (31 years and above). This fails to agree with literature which postulate that older teachers with more experience in teaching have a more positive perception towards use of ICT than the less experienced (Lau & Sim, 2008). Similarly, these findings do not agree with other findings that reveal that the younger teachers with fewer years of experience use computers more than teachers with more years of experience (Afshari et al., 2009). This study however brings together both schools of thought and agrees that neither the more experienced nor the less experienced teachers are better than the other. This entails that much as experience can be a factor to be considered to affect ICT integration, it is also a possibility that there is no relationship between teachers' work experience and their use of ICT in teaching as Wachiuri (2015) posits.

Finally, findings from the study reveal that science teachers' perception towards ICT integration is higher than languages and humanities. The findings agree with S. K. Howard et al. (2015) who found out that science teachers portrayed a higher frequency of using ICT than other subjects. However, this is in contrast with Balanskat (2006) whose study reveal that a much more impact is realized in the languages than the science subjects.

Conclusion and Recommendations

This study aimed at evaluating the factors that influence teachers' perception of ICT in teaching, among secondary school teachers in Malawi. Specifically, it aimed at how the perception is influenced through computer self-efficacy, subjective norm, job relevance, computer experience, ICT anxiety and enjoyment using computer. This study also aimed at exploring the experiences of using ICT in teaching from the perspective of teachers.

Based on the analysis which revealed that the perceptions of teachers are negative towards the integration of ICT in education, it can be concluded that there is a lot that needs to be done in terms of policy formulation as well as change in mindset. Additionally, it is prudent that the government of Malawi make proper revisions in terms of policy adjustments. For a start, the Ministry of Education must consider revising its education policy in terms of mandatory inclusion of ICT in teaching and learning. This will enable teachers to participate in the process of adoption of ICT in teaching.

From this study, it has also been revealed that teachers need to play a big role in using ICT. This role is in accordance to making using ICT part of their priority areas in teaching. This can even improve content delivery and improve the pass rate of students in final examinations.

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