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## THE INFLUENCE OF FACILITATING CONDITIONS, MODERATED BY SCHOOL TYPE, ON ADOPTION OF ELECTRONIC TEXTBOOKS IN TANZANIAN SECONDARY SCHOOLS.

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### ABSTRACT

This study examined the influence of facilitating conditions, moderated by school type, on adopting electronic textbooks in Dar es Salaam–Tanzania. The survey research design was used to collect data and assess study hypotheses. Proportionate stratification and simple random sampling were applied to choose the number of schools and 370 respondents from advanced-level students using closed-ended questions. The data were analyzed through multi-regression analysis where descriptive and inferential statistics were done with the aid of SPSS version 26. The pilot study, consultations with other researchers in the same field, and Cronbach's Alpha were used to determine the reliability and validity of the study. Results from the study revealed that facilitating conditions had a statistically significant positive relationship with students' behavioural intention to adopt e-textbooks (BIAET). Similarly, school type played a statistically significant moderating role in the relationship between Facilitating Conditions and behavioural intention to adopt e-textbooks. This study has practical implications for school-type administration and electronic textbook developers in encouraging e-textbook adoption motives to Advanced-level students in Tanzania. It suggests providing reliable internet, devices, expertise, and facilities and improving e-textbook platforms to meet the needs of Generation Z-students.

**KEYWORDS:** Adoption, UTAUT, electronic textbooks, facilitating conditions, school type.

### 1. INTRODUCTION

For a long time, printed textbooks have been a reliable means of imparting knowledge to students from pre-primary, primary and secondary schools (Souvik et al., 2022). The development and change of technology worldwide have changed even the means of imparting knowledge to students. The technology change has become the catalyst for the introduction of electronic textbooks in teaching and learning (Liu, Lin, Zhao and Zhao, 2019). Electronic textbooks are modern, digital versions of printed textbooks that are readable across several devices including laptops, smartphones and other electronic readers (Budu et al., 2018; Zhao et al., 2019; Foluke, 2020).

The development of Information Communication and Technology (ICT) in the education sector has made electronic textbooks available, accessible and utilisable not only in developed countries but also in developing ones (Kai, 2021). Electronic textbooks have enormous benefits such as mobility, storage capacity, affordability, simplicity of use, and full-text search functionality (Foluke, 2020). The electronic textbook has altogether come with anytime accessibility, availability and is environmentally friendly (Maduku, 2015).

In the developed world, such as the United States of America (USA) and Europe (United Kingdom and Sweden), e-textbooks are conveniently available and offer anytime accessibility on school campuses (Al Saadi *et al.*, 2017; Grönlund, *et al.* 2018). To date, e-textbooks are believed to be selling more than their corresponding printed editions in these countries due to a conducive environment, infrastructure, expertise, the low cost of mobile devices and the Internet (DeNoyelles *et al.*, 2017).

In Asian countries such as India, Saudi Arabia, and China students are getting electronic readers and contents at low prices due to many companies manufacturing e-readers with free e-contents (Enright, 2014). In these countries, e-textbooks adoption is influenced by availability, accessibility due to good infrastructure, low costs, price value, and habit (Poon, 2014; Hsu *et al.* 2017; Gengfu & Chotiyaputta, 2019; Rehman *et al.*, 2020). These adoption determinants drive the students into developing behavioural intention to use the e-textbooks with greater satisfaction in day-to-day use.

According to Crabbe and Nyingi (2014), electronic textbooks availability, accessibility and use have been facing a great challenge in African schools. Some of the challenges to e-textbooks adoption include not only slow internet connectivity, but also the infancy of e-textbooks in the market. Despite these challenges in Africa, e-textbooks adoption is still growing up although at low pace (Makwanya & Oni, 2019).

In Tanzania, various initiatives have been put in place to develop and use electronic textbooks. Policies (the National ICT Policy of 2016, Education training policy of 2014); visions (Tanzania Development Vision of 2025) and goals (the Millennium Development Goals of 2030) (Mrope, 2018) have been established among others, to enhance technology use in education sector including e-textbooks. Considering initiatives and policies in place, the Tanzania Institute of Education and other individual stakeholders including publishers have launched over 50 online applications and platforms for accessing electronic textbooks anytime, anywhere. Some of the online applications with electronic textbooks include TzShule, Darasani Apps, Maktaba Mtandao (TIE), Maktaba.Inc, Shule direct, ThL, TETEA Apps only to mention a few.

This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a guiding model for adoption of e-textbooks in Tanzanian schools. Specifically, the Facilitating Conditions (FC) variable from the UTAUT model and the demographic variable of school type were used to propose a framework for the students' behavioural intention to adopt e-textbooks in Tanzania. In this study, FC implies the degree of completeness of various technical knowledge conditions

required to use an e-textbook and the degree of compatibility between the device used by the individual and the e-textbook system. It denotes the availability of infrastructure, resources and supports to students to assist them use e-textbooks (Oyaid & Alshaya, 2019). This study regards the school as an institution in the general activities of the school type (private or public) in the education sector. Therefore, school type has been incorporated in this study as the moderating variable on the relationship between facilitating conditions and behavioural intention to adoption of e-textbooks (BIAET) in Tanzanian secondary schools.

### **1.2. Problem Statement**

To date, hardly 53 million Tanzanians have access to mobile devices with internet connectivity (TCRA Report 2023). Within a few years since the introduction of the 2014 Education Training Policy, e-textbooks via mobile devices have been introduced in Tanzania for easy accessibility to students and teachers. After the deliberate implementation of policies, initiatives, and programmes connected to ICT development in schools, electronic textbook platforms and applications are steadily gaining support among education stakeholders. These initiatives have made the Tanzania Institute of Education and other individual stakeholders including publishers to put in place the facilitating conditions such as the infrastructure, resources, guidelines and expert support. Despite the availability of infrastructure, resources, experts and applications as stipulated, only a few students in advanced-level secondary schools in Tanzania, use the e- textbooks in their studies (Mathew et al., 2018; Worldreader, 2021). Therefore, this paper examines how facilitating conditions, moderated by school type, influence students' behavioural intention to adopt e-textbooks in advanced level secondary schools in Tanzania.

### **1.3. Objective of Study**

To investigate the influence of Facilitating Conditions, moderated by school type, on adoption of electronics textbooks by advanced-level secondary school students in Dar es Salaam region. The specific objectives include:

1. Examine the influence of facilitation conditions on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools
2. Examine the influence of facilitation conditions, moderated by school type, on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools.

#### **1.3.1 Research Hypothesis**

This study largely hypothesized on the influencing determinants of advanced level students on adoption of e-textbooks in Tanzanian secondary schools.

1. Facilitating conditions have a significant positive influence on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools.
2. Facilitating conditions, moderated by school type, have a significant positive influence on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools.

## 2.0 LITERATURE REVIEW

### 2.1. The UTAUT Model

Venkatesh et al. (2003) propounded the Unified Theory of Acceptance and Use of Technology (UTAUT), then modified it in 2012. To understand user behaviour intention (BI) and actual usage (AU) of an information system, the UTAUT model incorporated eight models. According to Venkatesh et al. (2012), the model can account for up to 70% of the user behavioural intentions (BI) of an information system. UTAUT has been demonstrated to be more effective than previous models in explaining technology adoption and use.

According to the UTAUT model, four constructs determine the behavioural intention and actual information system utilisation (Venkatesh 2012). They consist of social influence (SI), facilitating conditions (FC), performance expectancy (PE), and effort expectancy (EE). The UTAUT effect is moderated by age, gender, voluntariness of use and experience. This paper only focuses on FC as a direct determinant to explain the behaviour intention of students on the adoption of e-textbooks while moderated by school type.

This paper only examined the influence of facilitating conditions constructs on the students' behavioural intention to e-textbooks adoption in the Tanzanian context while using EE and SI as control variables. Facilitating conditions is defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Venkatesh *et al.*, 2003, p. 453).

The paper has adopted the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model as a theoretical framework (Venkatesh et al., 2012). The models examined how facilitating conditions motivate students' behavioural intention to adopt e-textbooks in advanced-level secondary schools. The UTAUT model consists of two dependent variables of behavioural intention and actual usage of technology. This study will only use behavioural intention to examine if facilitating conditions influence students' intentions to use e-textbooks in their daily learning, as few students use e-textbooks in their studies.

### 2.2 Empirical studies on facilitating conditions with school type (ST)

Various literature which used the UTAUT perspective has suggested that facilitating conditions significantly influence the intention to adopt new technology, especially when the accessibility of resources is abundant (Yuan, Liu, Deng, Ding, & Wijaya 2023). Although many studies have attempted to show facilitating conditions to motivate behavioural intention to technology adoption that is appropriate for e-learning, very few studies are available on the effects of school type on the relationship between FC and BIAET in advanced-level secondary schools in Tanzania. Malero, Ismail, & Manyilizu, (2015) in Tanzania and Nchunge, et al. (2013) in Kenya reveal that the type of school influences technology adoption in the learning process. These studies have brought different results on technology adoption between private and public schools while considering the school type. Therefore,

respondents from private and public secondary were selected to determine how the type of school influences technology adoption in the education sector.

According to Setubal (2015), the impact of technologies in schools can be possible if the necessary conditions for their use are sufficiently and readily available in those schools. It means that technology adoption in schools will depend on the adequacy of training to users, availability, accessibility and utility of equipment, and the school administration's readiness to adopt the technology.

Several studies have been done, though not in Tanzania, on what determines a student to adopt e-textbooks for learning. Using FC as the main determinant of e-book adoption in South Africa, Maduhu (2015) identified FC as a vital determinant that affects students' e-books adoption. These results, however, are different from those of Gerhart, Peak, and Prybutok (2015), who claimed that e-books are not widely adopted because the functional differences between e-books and the traditional model prevent widespread adoption of e-books.

In particular, this study attempted to examine the influence of FC on electronic textbook adoption at the secondary level in Tanzania. Despite Tanzania's growing usage of the internet and other mobile technologies that allow for the use of e-textbooks, the adoption rate of e-textbooks in schools is taking a slow pace. The low adoption rate of e-textbooks in Tanzanian advanced-level secondary schools has brought about the need for this study. Hence, this study specifically examines the constructs of facilitating conditions (a variable from the UTAUT model), moderated by school type, on influencing the e-textbooks adoption in advanced-level secondary schools.

### 2.3 Research Framework

In this study, the researcher modelled school type as a moderator on the relationship between FC with BIAET in learning (see Figure 1). That is, the type of school directly moderated the relationship between FC and BIAET. Here, School Type (ST) was treated as a variable that moderate FC and behavioural intention to e-textbook adoption (BIAET).

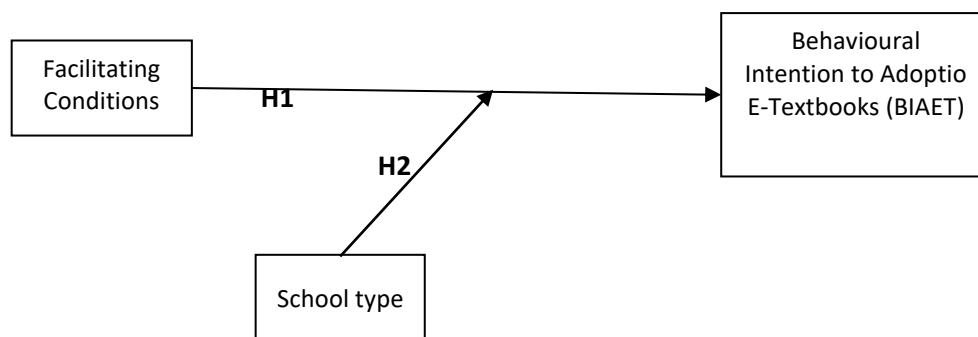


Figure 1. Study model

This study model shows how the dichotomous variable of ST (private and public school) moderates the relationship between the predictive and criterion variables. This study relied on the prior studies

relating public and private schools on technology adoption (Malero, 2015; Crabbe, Nyingi, & Abadzi, 2014; Olasehinde and Olatoye, 2014). This study used advanced-level students who were in session during data collection and who are termed Generation Z due to their age and strong command of using new technology such as mobile devices.

Further, the researcher tested only FC, one of the four independent variables in the UTAUT model. Since developing nations have fewer infrastructure, resources, expertise, and guidelines than developed nations, the current study concentrated on FC because it is essential for technological adoption in these nations. Additionally, the FC variable selection was made to reflect the study context and examine different strategies for overcoming the challenges related to e-textbooks adoption in Tanzania educational sector.

### 3.0 METHODS

The study adopted a quantitative research approach to examine the relationship between numerically measured facilitating conditions constructs and BIAET. Form V and Form VI students-in session during data collection, were used as the targeted population. Proportionate stratified and simple random sampling were used to select the study's respondents. Out of 6800 advanced-level students, only 370 respondents were selected. In each of the selected schools, the respondents were given the questionnaire during a break or class time. Before distributing the questionnaire, the researcher informed the respondents of the study's objectives and provided instructions on how to fill out the closed questionnaire. After that, the respondents only approached the researchers when they had questions about the questionnaire.

Data were collected in two months. It took hardly 20 minutes to fill out the questionnaires. The study's framework was modified to incorporate school type to determine whether it would moderate the relationship between the independent and dependent variables. There are no or few numbers of studies on the influence of school type (public and private) in the relationship between FC on BIAET adoption in Tanzania. Therefore, this study intended to fill that gap.

#### 3.1. Reliability and Validity of the Scale

The validity of the research instruments was done by experts in research, publishing, ICT, and blended learning. The hypotheses were formulated in line with the study's objectives. To determine the reliability, pilot testing the study tools with ten (10) respondents from each municipality, totalling 50 students. Dar es Salaam region has five (5) municipalities. A Cronbach value of 0.85 for Facilitating Conditions was obtained. Thus, the research instruments were considered reliable (Taber, 2018). The 5 Likert scales were adapted from Venkatesh et al. (2003).

### 4.0 RESULTS

The paper examined how facilitating conditions constructs influence advanced-level students' behavioural intention to adopt electronic textbooks in their studies. The study results are presented in the light of the respondents' profile, research hypotheses and Pearson Correlation Coefficient.

#### 4.1 Respondents Profile

The majority of the students 53% (196) were male, while 47% (174) were female. The respondents were youth aged 18-23 years old. Almost all the respondents, follow under the Generation Z category (born between 1995 to 2012). Generation Z are generally regarded as digital natives. The Form V respondents were 219 (59.2%), while Form VI were 157 (40.8%). The study considered only those respondents who were in session during data collection. The respondents' school type was analyzed too. Out of 370 respondents who completed and collected the questionnaires, 213 (53%) respondents were from public schools, while 157 (47%) were from private schools (Table 2).

**Table 1. Demographic characteristics**

Variable	Frequency	Percent
<b>Gender</b>		
Male	196	53
Female	174	47
<b>School type</b>		
Public	213	57.6
Private	157	42.4
<b>Education level</b>		
Form V	219	59.2%
Form VI	151	40.8%

*Source: data analysis (2021)*

#### 4.2 Correlation between the predictor and criterion variables

To determine the strength of the relationship between FC and the criterion variable (BIAET), bivariate correlation was used (Creswell, 2014). According to Samithambe (2019), the strength and direction of correlation varies based on levels. As indicated in Table 3, there was a moderate relationship ( $r = 0.534^{**}$ ,  $p = 0.001$ ) between the students' BIAET in learning and FC in this study.

**Table 2. Correlation Matrix between the FC and BIAET.**

VARIABLES	VARIABLES	
	BIAET	FC
BIAET	1	0.534**
FC	0.534**	1

\*\*Correlation is significant at the 0.05 level (2-tailed);

**Key:** Table 2 indicates the correlation of FC and BIAET. The marks \*\* indicate statistical significance at the 5% level.

### 4.3 Multiple Linear Regression Analysis Coefficients

Multiple Linear Regression Analysis investigated the relationship between FC, moderated by school type, and a dependent variable (BIAET). The relationship between the independent variable (FC) with corresponding moderators (school type) on BIEAET while controlling SI and EE, is explained here below:

**Table 3. Coefficients of multiple linear regression analysis**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	T	Sig.	Coefficients 95.0% Confidence Interval for B	
		B	Std. Error				Lower Bound	Upper Bound
1	(Constant)	.194	.181		1.073	.284	-.162	.551
	FC_score	.273	.054	.284	5.065	.000	.167	.379
	School type – recoded	.652	.269	.342	2.420	.016	.122	1.181
	SchooltypeXFC	-.211	.076	-.413	-2.759	.006	-.361	-.061
	SI_score	.129	.042	.136	3.052	.002	.046	.212
	EE_score	.506	.052	.483	9.799	.000	.404	.607

*Source: data analysis (2021)*

**Table 4: FC as a determinant of BIAET, moderated by school type**

Variable	Coefficient (p-value)	95% CI
School type (ST)	0.652 (.016)	-122, 1.181
FC Score	0.273(.000)	.167,.379
FC*ST	-0.211 (.006)	-.361, -.061

*Source: data analysis (2021)*

Controlling for EE, School type (ST), SI and ST\*FC in the model, the study revealed that for each unit score increase in FC, BIAET increased by 0.273 (95% CI: 0.167, 0.379). Based on the effect of FC on BIAET across school types, the study revealed that for each unit score increase in FC, BIAET



decreased by -0.211 (.006) (95% CI: -.361, -.061) among scholars in private schools as compared to scholars in public schools. At a threshold of significance of 5% ( $p=0.001$ ), the observed difference was statistically significant (Table 4).

## 5. DISCUSSION

### 5.1 The Influence of Facilitating Conditions on Behavioural Intention to Adopt Electronic Textbooks (BIAET)

The study hypothesis one was:

1. *Facilitating conditions have a significant positive influence on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools.*

While controlling other variables in the model, the study revealed that for each unit score increase in FC, BIAET increased by 0.273 (95% CI: 0.167, 0.379). As indicated in Table 4, there is a significantly strong correlation between FC and students' behavioural intention to the adoption of e-textbooks (BIAET) in learning ( $p = 0.001$ ). This study assessed students' behavioural intention to adopt and use e-textbooks in advanced-level secondary schools in Tanzania. The main finding was that Facilitating conditions had a significant influence towards students' behavioural intention to use the e-textbook. This was demonstrated by the findings that the construct of facilitating conditions had a significant influence on students' behavioural intention to use the e-textbook. These were surprising results because normally lack of resources in developing countries makes adoption more challenging (Thomas et al. 2013). This finding was in line with research done in both developed and developing nations, including that of Venkatesh, Thong, and Xu (2012), Martins et al. (2018), and Zhou et al. (2019).

### 5.2 The Influence of Facilitating Conditions, moderated by School Type, on Behavioural Intention to Adopt Electronic Textbooks (BIAET)

The study hypothesis two was:

2. *Facilitating conditions, moderated by school type, have a significant positive influence on students' behavioural intention to adopt e-textbooks in advanced-level secondary schools.*

On this hypothesis, ST is a statistically significant moderator of the relationship between FC and BIAET. The moderating effects were measured by including school type in the regression model. This was done by estimated by multiplying the independent variable (FC) and the moderator (school type). While controlling other variables, the study revealed that for each unit score increase in FC, BIAET decreased by -0.211 (.006) (95% CI: -.361, -.061) among scholars in private schools as compared to scholars in public schools. These results are based on the effect of FC on BIAET across school types. The observed difference was statistically significant at a 5% ( $p=0.006$ ) significance level (Table 4). These results show that the school type has a significant difference between public and private schools while ST indirectly influences BIAET and FC. The Facilitating Conditions directly predict BIAET

(Venkatesh et al. 2003). It reveals the difference in the behavioural intention of private and public-school students towards the facilitating conditions available for e-textbook adoption, depending on the type of school. In other words, ST is a statistically significant moderator of the relationship between FC and BIAET. The effect of FC demonstrates that private school students tend to be more influenced by BIAET than public scholars.

Those results are consistent with a study by Khechine, et al. (2014) in Canada who highlighted the variables that account for students' adoption of a webinar system (Elluminate) in a blended learning course. The study highlighted the effects of school type on the relationship between FC (a Unified Theory of Acceptance and the Use of Technology model) and BIAET. Results revealed that the facilitating conditions (technical and organisational assistance) were directly influenced by the intention to use a webinar. The limitation of this study was the small number of respondents which this study filled the gap. Thus, the facilitating condition is a significant factor in motivating students' behavioural intention towards acceptance of a webinar system at Laval University in Quebec, Canada. Similarly, previous researchers such as Malero, Ismail, & Manyilizu, (2015) in Tanzania and Nchunge, et al. (2013) in Kenya demonstrated the relationship between a school type with the adoption of technology in teaching and learning. Malero et al, (2015) and Nchunge, et al. (2013) reveal that the type of school influences technology adoption in the learning process. Therefore, this study was done in Tanzania at the advanced secondary school level with a quantitative approach with more respondents on the facilitating conditions while using school type as a moderating variable.

## **6. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH**

Facilitating conditions such as technical infrastructure support and user knowledge of e-textbooks use to improve the education level in advanced-level secondary schools in Tanzania. It is necessary to identify the features that influence students' acceptance of e-textbooks in their learning environment to encourage the adoption and usage of e-textbooks while considering the school type.

The empirical results of this study significantly broaden our understanding of FC constructs that influence students' decisions about adopting and using electronic textbooks in advanced-level secondary schools. The study results revealed that the school infrastructure, user knowledge, and availability of technology experts in the school environment influence the adoption of e-textbooks. These results will assist stakeholders to develop e-textbooks that are appropriate, relevant, and suitable to students following the facilitating conditions available. The conclusions of this article have significant ramifications for teachers, school administration, and developers of e-textbook applications. Future studies should take into account other variables from the UTAUT model and school type to predict behaviour intention to adopt and use e-textbooks in a given context.

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