FACTORS INFLUENCING THE ELECTRONIC TEXTBOOKS ADOPTION IN TANZANIAN HIGH SCHOOLS

ABSTRACT

Aim: Despite the availability of electronic textbooks via mobile devices applications in Tanzania, students in high schools are still slow in adopting them for their day-to-day studies. This study examined the influencing factors for electronic textbook adoption in Tanzanian advanced-level secondary schools. The study extends the UTAUT model's key constructs of Effort Expectancy, Social Influence, and Facilitating Conditions to include the type of school (private or public) as a new moderating variable in predicting the adoption of electronic textbooks.

Methodology: Data were gathered using a survey technique, which involved administering structured questionnaires to 370 respondents. Simple, stratified and proportional random sampling techniques was employed to select respondents from 22 sampled high schools in Dar es Salaam, Tanzania. The multiple linear regression technique was used to analyse data quantitatively. The reliability of the instrument was established through Cronbach's alpha which yielded a coefficient value ranging from 0.860 to 0.863 while publishers and research experts determined the validity the instruments. The study hypotheses were tested at a 0.05 level of significance.

Findings: Effort Expectancy (.506 (95% CI:.404,.607), Social Influence (.129 (95% CI:.046,.212), and Facilitating Conditions (.273 (95% CI:.167,.379) significantly and positively influenced the adoption of e-textbooks. The type of school negatively moderated the relationship between Facilitating Conditions and BI to Electronic Textbooks Adoption (-.211 (95% CI: -.361 to -.061)). The interactions revealed differences in private and public-school students' BI towards e-textbook adoption, where private scholars signify more effect than public schools.

Recommendation: with these findings, government, school administration, schools e-textbooks developers, propagators or distributors should improve the e-textbooks adoption infrastructures and distribution by putting in place user-friendly platforms and services that effortlessly and quickly fulfil the expectations of high school students.

Keyword: *Electronic Textbook, Social Influence, Type of School, Effort Expectancy, ETA, UTAUT, Facilitating Conditions*

1. INTRODUCTION

To date, schools in the developed world offer educational materials in a wide range of designs that can be delivered through the World Wide Web, the intranet, the extranet, or other electronic channels due to the rapid development of science and technology (Abbad Muneer, 2021). Mobile devices such as cell phones, tablets, e- readers and laptops are used anywhere with or without the internet to deliver e-materials including e-textbooks contents in schools. Consequently, e-textbooks have become more common in the first world as teaching and learning tools for students and teachers to printed books. As of now, e-textbook platforms are readily available practically everywhere. Students and teachers now have an opportunity to learn more whenever and wherever they want to because of electronic textbook availability (Eze *et al.,* 2020).

In developed nations, there has been a lot of interest in understanding what influences the user adoption of technology compared to developing ones (Ley, Tammets, Sarmiento-Márquez, Leoste, Hallik, & Poom-Valickis, 2021). Most of the prior studies done in developing countries, especially Tanzania, typically focused on e-learning devices as a whole without considering the applications and platforms that contain the authorised e-materials for use by students. Studies on the effects of Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) (UTAUT variables) while influenced by the Type of School (TS) in the usage of e-textbooks at the secondary level have been conducted partially or not at all in Tanzania.

Additionally, studies on electronic textbooks adoption while considering public or private schools (type of school) at this level of education in developing countries are limited. Type of School (TS) refers to the difference in school set-up being public (government and community schools, both of which are subsidised by the government for recurrent costs) and private schools (not owned by the government) typically relying almost entirely on students' fees as well as owners' funding to cover school expenses.

This study has adopted three UTAUT variables and incorporated type of school (TS) as a novel moderating factor from the characteristics of this study's respondents and other literature reviewed. Using the extended UTAUT model (Venkatesh, 2012) and adding type of school (organisational setup) as one of the moderators creates an integrative adoption model that links the relationship between the independent variables (EE, SI, and FC) and the dependent variable of behavioural intention (BI) to E-Textbooks Adoption (ETA). Inclusion of the type of school will add to the selected UTAUT constructs by testing its effect on electronic textbooks adoption in Tanzania's educational sector (Venkatesh, 2012). This study addresses the lack of adoption models and novel interactions with contemporary technologies at the institutional level that allow for a wide spectrum of individual technology acceptance and use in Tanzania.

1.2 Research Objectives and Hypotheses

This study's main objective was to examine how social influence (SI), facilitating conditions (FC), and effort expectancy (EE) affected the adoption of electronic textbooks in Tanzanian private or public high schools. The following study objectives and hypotheses served as the study's guidelines:

1.2.1 Research Objectives

1. Effort expectancy influences the BI of high school students towards ETA
2. Social influence affects the BI of high school students towards ETA
3. Facilitating conditions, moderated by type of school, influence the BI of high school students towards ETA

1.2. 2 Research Hypotheses

The first two research objectives have one hypothesis except objective three which is sub-divided into two hypotheses. The dependent variable (BI to ETA) is directly related to Hypotheses 1, 2 and 3 and hypothesis 4 has the interaction terms (FC with type of school).

H1: Effort Expectancy has a significant positive influence on high school students' BI to ETA

H2: Social Influence has a significant positive effect on on high school students' BI to ETA

H3: Facilitating Conditions has a significant positive influence on high school students' BI to ETA

H4: Facilitating Conditions, moderated by type of school, has a significant positive influence on high school students' BI to ETA

2. STUDY MODEL AND CONCEPTUAL FRAMEWORK

Technology adoption has been explained using a variety of models and theories. These include the Theory of Reasoned Action (TRA) by Fishbein & Ajzen (1975); Technology Organisation Environment (TOE) framework by Tornatzky & Fleischer (1990); Technology Acceptance Model (TAM) by Davis (1989), Theory of Planned Behaviour (TPB) by Ajzen (2002); Diffusion of Innovation Theory (DOI) by Rodgers (2003), and UTAUT by Venkatesh et al. (2003). UTAUT model integrates eight (8) earlier models of technology adoption and makes it the best model indicating better individual adoption of technology out of these theories and models (Abbad, 2021).

The UTAUT model employs experience, gender, age, and involuntariness of use as moderating variables, while Performance Expectancy (PE), EE, FC, and SI serve as predictors of behavioural intention (BI) and actual usage (Venkatesh, 2003). The UTAUT model's flaw is that it ignores various organisational structures that can affect technology adoption. UTAUT model anticipates that users can use the information system irrespective of institutional settings (Davis, 1989). This paper has incorporated the school's type as a moderating variable to assess the use of electronic textbooks in the Tanzanian

educational sector. The respondents' demographic features and the literature review from Malero, Ismail, & Manyilizu, (2015) are taken into account when choosing the type of school to be a moderating variable (Bukagile, Ngirwa, & Babyegeya, 2023).

To understand the way technology is adopted at an organisation level, it is better to consider organisation-level setups. This connotes that e-textbooks users will have different influencing ways of e-textbooks adoption due to the settings of their school organisation, technology and environments surrounding them (Ibrahim, Vasalou, & Benton, 2022). Therefore, this emphasises the necessity of understanding the type of school (private or public) as a crucial moderating construct to evaluate technology adoption, particularly the adoption of e-textbooks in Tanzanian schools.

As a result, a new variable called type of school was added to the UTAUT theory to modify the predictor (FC). The theoretical framework for this study was developed based on some of the variables from the UTAUT model. The framework assumption was that EE, SI, and FC all directly influenced the adoption of electronic textbooks in Tanzania's high schools, whereas type of school moderated the relationship between FC and BI to ETA.

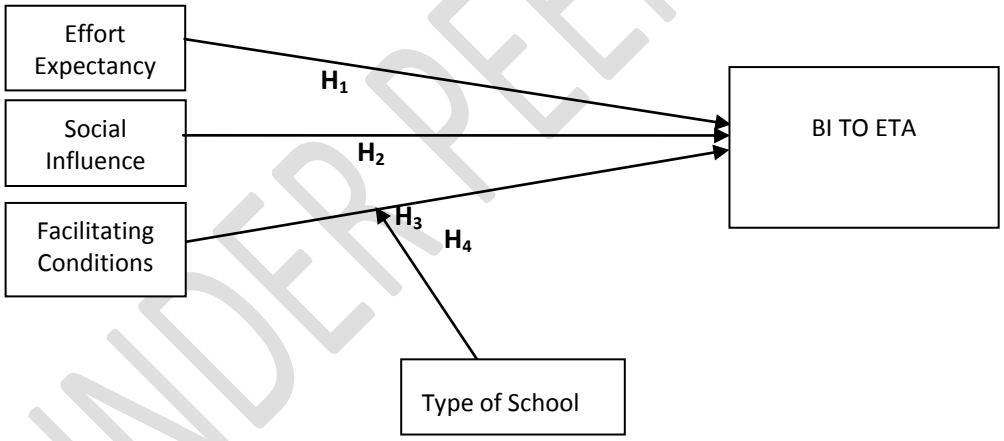

Figure 1: The Conceptual Framework

3. METHODOLOGY

3.1 Population and sample

The survey for this study had 370 respondents (98%), from high school students in Dar es Salaam region. The study population consisted of pupils from 22 schools spread across the five municipalities. For primary data collection, a closed questionnaire was used. The questionnaire was primarily divided into five sections which were demographic information of respondents, and other items related to BI to ETA, EE, SI and FC variables. The Dar es Salaam area was selected due to the presence of appropriate e-textbooks adoption infrastructures, presence of Tanzania Institute of Education (a government institution dealing with printed and electronic textbooks writing, and distributions) in the area, having many e-textbooks platforms developers, and having many high schools (78) for sample adequacy (BEST, 2020).

Proportionate stratified and simple random sampling were used to select respondents who have access to e-textbooks and e-textbooks reading devices. Data were gathered using a cross-section study design, which entails gathering information all at once. The measuring scale was a five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree." Five items, modified from Venkatesh et al. (2012) and Gao et al. (2011), were used to measure EE. Five items from Gao et al. (2011) and Kim et al. (2010) were used to measure SI, five items from Venkatesh (2012) were used to measure FC, and five items from Davis (1989) and Duzevi et al. (2016) were used to measure BI to ETA.

3.2 Reliability and Validity

The reliability test was run to ensure the measurements of study's internal consistency (Saunders et al. 2012). The reliability of the research instruments was evaluated in this particular case using Cronbach's alpha coefficient. The Cronbach's alpha reliability scores varied from 0.80 to 0.863, indicating that the values were above the minimum cut-off point of 0.7, revealing that the questionnaire was reliable in measuring the intended studied constructs (Saunders et al., 2012). Research experts in the fields of research, blended learning, and publishing were consulted, and study hypotheses were developed in accordance with the study's objectives in order to assess the research instrument's validity in terms of content.

Table 1 shows the reliability results

Construct	Reliability Cronbach's alpha
BI to ETA	0.86
EE	0.863
SI	0.858
FC	0.80

Source: Fieldwork, (2022)

4. RESULTS

This paper was to examine the high school students' influencing factors for building BI on ETA in their studies. The respondents' demographic features, research hypotheses, and Pearson correlation coefficients are all addressed in tandem to the study's findings.

4.1 Demographic characteristics of respondents

The study's demographic characteristics included high school students from different schools. The 213 (57.6%) students were from public schools while the rest 157 (42.4%) students were from private schools found in Dar es Salaam region.

4.2 Correlation Analysis

The postulated relationships between the UTAUT key variables in Hypotheses 1 to 3 were tested to see if they supported the sample using the Pearson product moment correlation coefficient. As a general rule, a correlation coefficient below +-0.30 is typically considered little; between +-0.30 and +-0.50 is considered low; between +-0.50 and +-0.70 demonstrates a moderate effect; between +-0.70 to +-0.90 is high and +-0.90 or more is generally considered extremely high (Samithambe, 2019).

Table 2 Directions and strength of the correlations

Little	+-0.00 +-0.30
Low	+-0.30 +-0.50
Moderate	+-0.50 +-0.70
High	+-0.70 +-0.90
Extremely	+-0.90 1.00

In this study, the results of the Pearson product-moment correlation revealed a moderate significant positive relationship between effort expectancy and BI to use e-textbooks (*r*.699, p.05). Additionally, there were a moderate positive correlation between facilitating conditions and BI that were statistically significant (*r*.534, *p*.05), as well as between social influence and students' BI to ETA (*r*.462, p.05) as shown in Table 3. As a result, H1, H2, and H3 were determined to support the findings by showing the moderate correlational effects on BI to ETA. Table 3 presents the results of the study.

Table 3 Pearson correlations results

IV	**Pearson correlation**	**BI to ETA**
EE	R	.669
	Sig.(2tailed)	.000
SI	R	.462

	Sig.(2tailed)	.000
FC	R	.534
	Sig.(2tailed)	.000

4.3 Multiple Linear Regression Analysis coefficients

To test the study's hypotheses, multiple linear regression analysis was applied.

Table 4 The Multiple linear regression analysis

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
(Constant)	.194	.181		1.073	.284	-.162	.551
FC_score	.273	.054	.284	5.065	.000	.167	.379
Schooltype – 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

a. Dependent Variable: BI to ETA_score

4.4 The Model summary

The results in Table 5 below indicated that the predictors in the model are capable of predicting over 50% of the variance in BI to ETA.

Table 5 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.710[a]	.504	.497	.66925	1.104

a. Predictors: (Constant), EE_score, Schooltype - recoded, SI_score, FC_score, schooltypeXFC

b. Dependent Variable: BI to ETA score

5. DISCUSSIONS OF THE FINDINGS

The main objectives of this study were to examine the influence of FC, SI and EE on the e-textbooks adoption and the use of type of school (TS) as the moderator on the relationship between FC and BI to ETA. Specifically, the study examined if type of school moderates the relationship between FC and BI towards ETA by students in high school education in Tanzania.

This part is discussed in the rights of objectives and the hypotheses in each objective.

5.1 Effort Expectancy influences high school students' BI to ETA

The hypothesis for objective one was as follows:

H1: *EE has a significant positive influence on BI to ETA*

While controlling other variables, the multiple linear regression model, demonstrated that, for each unit increase in EE, BI to ETA increased by.506 (95% CI:.404,.607). The results of Table 3 showed the significant effect of EE on the adoption of e-textbooks (p>0.05). Additionally, it is pointed out in this study that the effort expectancy variable is the most significant predictor of BI.

According to Park, Yang & Lehto (2007) effort expectancy is widely accepted as one of the main factors of technology adoption behaviour because, without the ease of use, users will get challenged by the novel technology and ignore its adoption unless outside forces are applied. The study results provide strong empirical support for the findings of Venkatesh et al. (2003) and Venkatesh et al. (2012) on the UTAUT model and follow-up researchers that applied the UTAUT model to understand technology adoption, use and acceptance behaviour (Venkatesh et al. 2003; Venkatesh et al. 2012; Kaba & Touré 2014). The technology adoption, particularly e-textbooks, is significantly influenced by effort expectancy in previous studies such as that of Farias, Pedro, Mateus, Pedro, Melo, & Santana, (2018) on adoption of technology for reading and that of Mtebe, Raisamo, & Mtebe, (2014I) in Tanzania on the Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania. Few or no any researcher has specifically examined the influence of EE on e-textbooks in high schools, instead, they did it on e-learning in its totality (Lwoga and Lwoga, 2017; Lubua & Semlambo, 2017). Therefore, this paper has filled that gap.

5.2 Social Influence affects high school students' BI to ETA

The hypothesis for objective two was as follows:

H2: *SI has a significant positive influence on BI to ETA*

Holding other factors fixed, the multiple linear regression model demonstrated that the BI to ETA increased by 129 (95% CI:.046,.212) for each unit increase in SI. The results of Table 3 revealed that adoption of e-textbooks was significantly influenced by social influence (p>0.05) The simple linear regression model demonstrated SI to have a significant positive relationship with BI to ETA. In particular, the findings on social influence showed a significant effect on students' BI to ETA in Tanzanian high schools. This study findings are consistent with the study by Lin and Lin (2019) in Fujian, China; Okocha (2020) in Nigeria and Cheng, Chen, and Chen (2014) in Taiwan.

5.3 Facilitating Conditions influence high school students' BI to ETA

There are two hypotheses for objective three. The hypothesis one stated as follows:

H3: *FC has a significant positive influence on students' BI to ETA*

After controlling for other model factors, the study found that the BI to ETA increased by.273 (95% CI:.167,.379) for every unit score rise in FC. The correlations between the criterion variables (BI to ETA) and the predictor variable (FC) are shown in Table 3. From the analysis, the FC showed a strong significant positive relationship with BI to ETA. The paper findings demonstrated that FC has a direct significant influence on students' BI to adopt e-textbooks in Tanzanian education sector.

The respondents revealed that they might use e-textbook platforms if they had abundant resources for promoting technology adoption on school campuses. As has been previously stated, the user solely uses the available resources, information, and assistance (Ejiaku, 2014). The study's findings correspond to those of Kamarozaman, & Razak's (2021) research. According to Zhou et al. (2019) and Hsu et al. (2017), FC should have had a positive effect on the adoption of e-books. For optimal result in Tanzania, the e-textbook designer and distributors need to take into consideration the school infrastructures, instructor expertise, and student needs. It signifies that researchers and those responsible for developing and disseminating electronic textbooks must keep putting the wants and needs of students before anything else.

The hypothesis two of objective three stated as follows:

H4: *FC moderated by type of school, has a significant positive influence on students' BI to ETA*

The interaction effects (or moderation effects) of TS on FC and BI to ETA were measured by adding another term to the regression model to be estimated by multiplying the independent variables and the moderator (type of school). The type of school was coded with public schools in the control category. The block method was employed to perform the regression analysis for the interaction effects. The first block of the model included effort expectancy, social influence, and facilitating conditions. The second block then had all of these variables (SI, EE, and FC), as well as the interaction terms (type of school dummy) and FC. The significance level for the interaction effects was set at 0.05.

As can be seen from the findings shown in Table 3, ST exhibits a statistically significant negative interaction effect on the relationship between FC and BI to ETA (p>0.05). While holding other variables in the model constant, the effect of FC on students' BI to ETA across types of school, revealed that for each unit score increase in FC, BI to ETA increased by -.211 (95% CI: -.361 to -.061).

This study considerably contributes to the body of literature by exploring a previously unexplored moderating effect of "type of school" on the relationship between facilitating conditions and BI to ETA. The findings of this study revealed that students in a certain type of school (public and private) have different beliefs on the BI to ETA due to differences in facilitating conditions available in their particular school campuses. In particular, the results indicated that private schools have a stronger effect on facilitating conditions than public schools. It implied that students in private and public schools deserve different treatment since they hold distinct perspectives regarding the availability of infrastructure, resources, and knowledge concerning the e-textbooks adoption in the schools they attend.

Therefore, H1, H2, and H3 revealed a positive statistical support for BI to ETA. However, H4 shows that the effect of FC on students' BI to ETA across types of school, has a negative beta value of -.211 (p>0.05). The relationship between FC and BI to ETA was adversely affected by TS's interaction effect, which was statistically significant (Table 3). Compared to public schools, the impact of FC through private schools had a more effect on BI to ETA. This study is consistent with the study by Bukagile, Ngirwa and Babyegeya (2023) which tested the moderating effect of school type on SI and FC in Tanzania.

6.0 Conclusion and Recommendations

The results of the study analysis suggest that social influence (SI), effort expectancy (EE), and facilitating conditions (FC) have direct statistically significant relations to high school students' BI to ETA. Type of School (TS) statistically affects the relationship between Facilitating conditions and BI to ETA. These results provide information on the characteristics that influence how users adopt e-textbooks in the Tanzanian educational system, with a focus on the significance of FC moderated by TS as the determining factor for BI to ETA in Tanzanian secondary schools. The empirical results of this study significantly broaden our understanding that EE, SI and FC variables influence users' choices on the adoption of digital related textbooks in high schools. The study results revealed that the ease of use of technology, believing in others people's opinions, availability of appropriate infrastructure, experts and other resources in the school campuses influence the adoption of e-textbooks.

This paper's findings provide public and private schools insights about what features to add to make students adopt e-textbooks ease. The study recommends to the school management and teachers to use available devices with e-textbooks to motivate their students to adopt the same. Subsequently, this may result in increasing more e-textbooks users. The paper demonstrates the need to continue using some UTAUT variables by combining them with other moderating construct including TS, as a way of improving the model's ability to predict the adoption and use of electronic textbooks in educational or other sectors in Tanzania and beyond.

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