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Predicting Students' Intention and Actual Use of E-Learning Using the Technology Acceptance Model: A Case from Zimbabwe

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Abstract. This study investigates the extent to which the Technology Acceptance Model (TAM) constructs predict intention to accept and use technology in learning. Data were obtained from 337 students from Bindura University of Science Education (BUSE) in Zimbabwe. The findings made three revelations. First, usefulness appears as an important driver for intention to use e-technology in education. Second, Ease-of-Use was contrary to the hypothesis, but was statistically insignificant. Third, Behavioural Intention has a positive and a strong association with Actual Use. The findings suggest several implications for theory and policy. In theoretical terms, the study provides evidence for the predominance of Usefulness over Ease-of-Use in predicting intention to adopt e-learning among students. In practical terms, the study shows that to ensure that students use particular technologies for study, a functionally useful system must be put in place. As such, technologies, which do not meet this condition, may simply be ignored.

Keywords: Technology Acceptance Model, Usefulness, Ease-of-Use, Intention, E-Learning, University, Zimbabwe.

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1. Introduction

1.1 Background to the study

What factors make one student embrace e-learning technology and another stick with the traditional pen and paper mode? What relationships exist among these factors? These are the two broad questions which this study seeks to answer. More specifically the study investigates factors that influence students' intention and actual use of e-learning technology, using the Technology Acceptance Model (TAM**)**. The study is based on two underlying assumptions: (1) adoption of e-learning technology is not a matter of chance but depends on certain identifiable and measurable factors, and (2) sustainable strategies for e-learning technology adoption should be oriented towards the use of persuasion rather than coercion.

E-learning Technology refers to a broad range of communication, information and related technologies that support teaching, learning and assessment: it is learning that is electronically or Internet or Web-enabled. E-learning relies on the use of technologies such as computers, mobile communications, newsgroups and interactive television (Kotler & Armstromg, 2009).

Teaching and learning over the Internet is generally a significant breakthrough in education (Keller & Cernerud, 2002; LaRose, Gregg, & Eastin, 2006) primarily because of its interactivity and convenience. In fact, e-learning technologies have gradually become a key factor in enhancing teaching and learning in determining the success or failure of institutions. As a result, technology is increasingly being integrated in classrooms to facilitate and enhance students' learning. However, for e-learning systems to be successful, students must accept and use them. As an educated segment of the community, tertiary education students generally possess good basic knowledge about the benefits of using technology for e-learning and would therefore, use it. Contrary to common expectation, several research findings show that higher levels of knowledge do not necessarily result in substantial higher levels of application of e-learning technologies (Holden, Ozok, & Rada, 2008). This study aims to explore the reasons behind the observed discrepancy between knowledge and behaviour by searching for the important predictors of e-Learning adoption among tertiary level students at the University of Bindura, Zimbabwe.

1.2 Global Problem Statement

Extant literature shows that much research has been undertaken on the acceptance and use of technology (Mahmood, Hall, & Swanberg, 2001). However, the literature shows two major gaps. First, the majority of these studies have focused on users in advanced countries with developing countries receiving relatively little attention (Hasan & Ditsa, 1998), yet they have much to gain from exploiting the Internet and IT in general. Second, even though globally the number of computers in schools has increased, technology acceptance and use in the classroom and learning remains relatively low (Holden, Ozok, & Rada, 2008). Specifically, one study (Anderson & Groulx,

2015) concluded that extensive technology acceptance and use on school campuses remains largely uncommon. This suggests that the use of the technology available in education is still not fully utilised in learning. With regard to Africa: of the various studies undertaken (Chau & Hu, 2002; Dede, 2005; Barak, Boston, Shimaneni, & Dunckley, 2006; Cant & Bothma, 2010; Im, Seongtae, & Myung, 2011; Agbatogun, 2013; Attuquayefio & Addo, 2014; Kar, Birbal, & Mondal, 2014; Khumalo, 2014; Tsekea, 2016) the majority of these found low uptake of e-learning technologies.

1.3 Problem at Bindura University

Bindura University of Science Education (BUSE) is an institution of higher learning which was established in 1996. It runs the Moodle Platform, Integrated University Management System (IUMS), e-library, website marketing, mobile learning, content marketing and social media marketing. Students can learn and hold discussions online using the platform. Students can upload assignments and the lecturer can mark and return them using the same digital means. Moreover, the instructors can upload videos, digital journal articles, audio recorded programmes and even interactive chats. Furthermore, students can learn on the go and there is no need to carry large bags of note-books. Also, academic stuff can be stored in smart phones, iPads and tablets.

Despite the university's investment in e-learning technologies, the BUSE e-Library Access Report of 2016 showed that the total number of searches for the digital resources stood at 2,298 since the establishment of the digital library six years earlier. This figure means that on average only 32 students per month accessed the platform out of a student population of 5,673. This usage pattern, when compared with developed countries indicates that this resource is underutilised. Specifically, these figures compare unfavourably with Antioch University in the United States, which has a student population of 4000 and registered 51,103 downloads of digital resources by its students in the 2013-2014 academic year (Allison, Bottu, Heckadon, & Leider, 2016).

1.4 Objectives and Hypotheses

The overall objective of this study is to investigate the extent to which the TAM constructs predict intention to accept and use Technology in learning. More specifically, the study addresses the following objectives:

1. To explore the explanatory and predictive power of the Technology Acceptance Model constructs: Perceived Usefulness and Perceived Ease-of-Use.

2. To explore the relative importance or contribution of the constructs of the theory in explaining and predicting intention to and actual use of e-Learning technologies.

Based on the objectives, the extant literature and intuition, the following hypotheses are proposed**:**

Hypothesis 1: Perceived Usefulness **(PU)** is positively associated with students' **B**ehavioural **I**ntention (**BI)** to use e-Learning technologies**.**

Hypothesis 2: Perceived **E**ase-of-**U**se (**PEU**) is positively related to students' **B**ehavioural **I**ntention (**BI)** to use e-Learning technologies**.**

Hypothesis 3: Behavioural **I**ntention (**BI)** has a positive and strong association with students' **A**ctual **U**se of e-Learning technologies **(AU).**

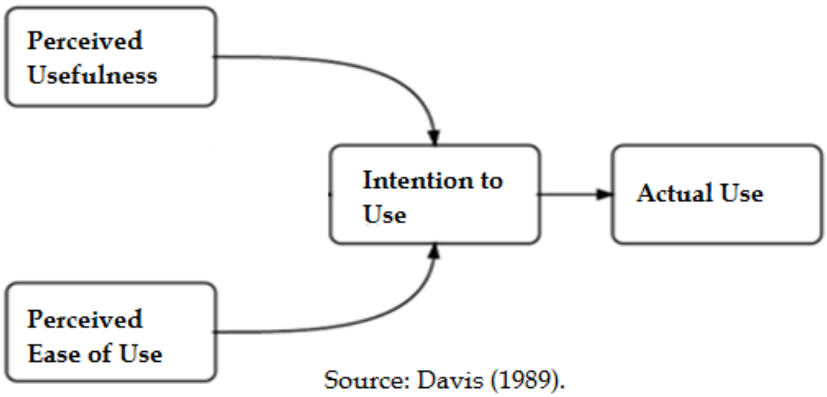
2. Literature Review

The aim of this section is to search for a structure within which to conduct the study in an orderly way. In accomplishing this, first, the important features of the literature are reviewed in order to identify contributions made by others in this area. This facilitates the study by narrowing down the range of reasonable factors and explanations. The literature on the determinants of acceptance or resistance to new technologies may be divided into two categories: that dealing with conceptual contributions and that concerned with empirical outcomes.

a. Conceptual Literature

One of the most popular theories for investigating acceptance or resistance to new technology is the TAM. It was developed by Davis (1989). It seeks to explain how users come to accept and apply a given technology. In its simplest form, the theory proposes that when users get exposed to new technology, two major factors explain and predict their decision as to how and when they will accept and use it. Specifically, two factors or beliefs (Figure 1) are considered to impact on technology adoption:

- **Perceived Usefulness:** The extent to which a person believes that using a particular technology would enhance his or her work performance (Davis, Bagozzi, Warshaw, & 1989).
- **Perceived Ease-of-Use:** The degree to which a person believes that using a particular technology would be free of effort (Davis, 1989).



Source: Davis (1989).

Figure 1: Original Technology Acceptance Model

To begin with, TAM is an adaptation of the Theory of Reasoned Action (Fishbein & Ajzen, 1980), which is specifically tailored for modelling user acceptance of information systems. The original TAM has since undergone several refinements and extensions aimed to enhance the understanding of technology adoption. First, in some formulations (Pavel & Rajagopal, 2015), the two beliefs are thought to affect the user's attitude towards the technology, which, in turn, affects his or her intention to adopt the technology and eventually actual use. Second, another formulation developed a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by introducing external factors such as subjective norms in to the model (Abdullah, & Ward, 2016; Kimathi & Zhang, 2019).

Third, there are several other extensions to the model, of which the most prominent is the Theory of Planned Behaviour, which introduced the concept of *self-efficacy* or perceived behavioural control as another predictor of intention. In this regard, a behaviour tends to be under a person's control when the individual feels that he or she can decide at will to perform it or not. On the other hand, some internal and external factors can interfere with control over behaviour. Internal factors knowledge, include skills and abilities whereas external factors are time, opportunity and dependence of the behaviour on the co-operation of other people (Ajzen & Madden, 1986). Consequently, the fewer obstacles individuals anticipate, the greater will be their perceived control over the behaviour. In fact, people are not likely to form a strong intention to use a technology if they perceive many obstacles to using it, even if they perceive benefits and ease of use of that technology.

Fourth, there have been a number of alternative models such as the diffusion of innovation theory (Rogers, 1995). Fifth, attempts there have been made to combine a number of theories into a single useful model. One attempt (Venkatesh, Davis, & Davis, 2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT), which includes: (1) Performance Expectancy (PE), (2) Effort Expectancy (EE), (3) Social Influence (SI), and (4) Facilitating Conditions (FC) among the main explanatory factors behind technology adoption and use. Another study (Dwivedi, Rana, Anand, Clement, & Michael, 2017) revised the UTAUT model to introduce individual characteristics such as attitude not theorized in the original model.

However, the simplicity of the original TAM (Davis, 1989) remains appealing due to its face validity in the eyes of respondents. As the literature reviewed indicate, the core concepts of functionality and ease-of-use constitute a successful basis for a number of revised models (Rob, Thorpe, & Grainne, 2012). In other words, these two factors are particularly crucial in understanding technology use. Thus, hypothesis one on Perceived Usefulness and hypothesis two on Perceived Ease-of-Use would be tested.

Finally, most intention models (Theory of Planned Behaviour, Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology) position behavioural intentions in a powerful position in relation to behaviour.

Numerous correlational studies indicate that intentions do predict behaviour (Sheeran, & Webb, 2016). For example, one author (Sheeran, P, 2002) meta-analysed 10 earlier meta-analysis studies (422 individual studies in total) and found good average correlation between intentions measured at one time-point and behaviour taken at a subsequent time-point ($r^2 = 0.53$).

Because of its strong relationship to behaviour, many studies that use intentions as part of their theory base, measure behavioural intentions and forego the more difficult measurement of behaviour. This discussion suggests that, intention offers a superior prediction of behaviour to other cognitive factors (such as perceived usefulness, perceived ease of use) and affective factors (such as attitudes, norms, self-efficacy, perceptions of risk perception of severity and personality). This proposition is supported by several other studies (Sheppard, Hartwick, & Warshaw, 1988; Rhodes & Smith, 2006; Poropat, 2009; Chiaburu, Oh, Berry , Li, & Gardner, 2011; McEachan, Conner, Taylor, & Lawton, 2011). It is on this basis that we derive the third hypothesis to the effect that Behavioural Intention has a positive and more powerful association with actual use of e-learning technologies than perceived usefulness or perceived ease-of-use.

b. Empirical Literature

In empirical studies several investigators have replicated Davis's original study (Davis, 1989) to provide evidence on the hypothesised relationship among usefulness, ease of use and technology adoption. The first set of investigators focused attention on testing the robustness and validity of the questionnaire employed by Davis. Three authors (Adams, Nelson, & Todd, 1992) replicated the work of Davis, in different settings, using two different samples. Their findings demonstrated the validity and replication reliability of the scales used. Another group of three investigators (Hendrickson, Massey, & Cronan, 1993) found a high reliability and good test-retest reliability. One investigator (Szajna, 1994) found that the instrument had good predictive validity for intention to use, self-reported actual usage and attitude toward usage. In sum this line of research has confirmed the validity of the Davis questionnaire, and supports its use in different populations and different settings.

The second set of investigators focused on improvements to the TAM. Two authors (Segars & Grover, 1993) re-analysed the Adams, Nelson, & Todd (1992) replication of the Davis research. They proposed extension of the model into three constructs: usefulness, ease-of-use and effectiveness. The revised model does not yet seem to receive much support in the empirical literature. Another group of three authors (Keil, Beranek, & Konsynski, 1995) elevated the Davis's model into what has been described as the Usefulness/Ease-Of-Use (EOU) Grid, which is a 2×2 grid where each quadrant denotes a different combination of the two characteristics. The grid provides a framework for discussing the mix of usefulness and EOU for a particular technology; it can be used for plotting and analysing different technologies. This simple TAM grid or model has been used

in different contexts including in health care, which is fast growing (Rahimi, Nadri, Hadi, & Timpka, 2018).

The third is a set of investigators in recent years that focused on measuring the predictive power of the constructs making the TAM. One study by four authors (Rahman, Deb, Carruth, & Strawder, 2019) investigated the Advanced Driver Assistance Systems (ADAS) that is designed to support drivers with information on vehicle control in critical situations. 37 participants were given a 10-minute driving practise with a virtual driver assistance system. After the test drive, they were given a survey questionnaire that measured different constructs of TAM. The results confirmed that TAM constructs significantly predicted drivers' willingness to use an ADAS, explaining more than 68% (adjusted R^2) of the variability in intention. Another study (İbili, 2019) found that Perceived Ease of Use had a direct effect on Perceived Usefulness.

3. Methodology

This section describes the methods by which primary data were obtained and analysed. Specifically, it deals with the research philosophy, design, development of the instrument, sampling, data analysis, and ethical issues.

a. Research Philosophy, Design and Analysis

This study is based on a positivist rather than an interpretive philosophy about the world. Positivism assumes that a phenomenon is objective and can be described by measurable properties, akin to those of the natural sciences that are independent of the researcher. On the other hand, interpretivism treats phenomena as not objective, but as socially-constructed to which people render meaning.

The research design adopted was *descriptive* because the researchers, through theory, have much prior knowledge about the phenomenon under study and, as such, the study rested on specific hypotheses that guided the research in a specific direction. Overall, the research procedure is deductive.

The study carried out a cross-sectional survey because in many cases surveys allow for the use of quantitative techniques to analyse mass data. A survey is advantageous because it fosters objectivity in analysis. Finally, the study computed averages and percentages, which permitted the coming up with findings that demonstrate a high degree of objectivity.

b. Sampling

The target population for this study was made up of all the 5,673 undergraduate students registered at Bindura University of Science Education (BUSE) by 1st June 2017. The study used a combination of judgment, convenience and cluster sampling techniques. BUSE was included under judgmental sampling for it was the institution of the second author of this paper, at the time of the research.

Then using convenient sampling, the study drafted faculties that were willing to participate in the research, particularly after receiving permission from respective deans. Finally, the study used cluster sampling for the distribution of questionnaires to whole classes after getting the necessary permissions from respective class instructors. In all, 337 filled out questionnaires were received from the students.

c. Development of Instrument

The questionnaire was developed using the basic TAM model, as adapted for this study. The two constructs that are key direct determinants of technology acceptance were each measured by several statements as follows: Perceived Usefulness (6 statements), Perceived Ease-of-Ease (6 statements). The two dependent variables Intention to Use and Actual Use were measured using 3 and 2 statements, respectively.

The questionnaire was made mostly of close-ended questions that employed the Likert scale ranging from 1 to 5; where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5= Strongly Agree. The draft questionnaire was pre-tested on 10 respondents. The pre-testing resulted in corrections of editorial, typographical, readability and leading questions.

d. Data Coding and Entry

Data processing involved coding and entry into computer all the 337 questionnaires collected from students ready for analysis, using the IBM Statistical Product and Service Solutions (SPSS) software version 25.

e. Data Transformation

Data preparation for the main analyses (regression) involved data transformation into new variables. The aim of data transformation was to create variables in the TAM. This transformation involved clustering and collapsing variables measuring each construct into a single variable. For example, the 6 items used to measure Perceived Usefulness were consolidated into a single variable by determining the mean of the items within each scale (Table 1). The same approach was used for the other TAM variables which are Perceived Ease-of-Use, Intention to Use and Actual Use. Initially, Intention was used as a criterion variable before being used as an explanatory variable.

Table 1. Grouping of Subject Matter Variables

New variable	Number of Items Grouped	Grouping Statistic	Type of Variable
Perceived Usefulness	6	Mean	Explanatory
Perceived Ease-of-Use	6	Mean	Explanatory
Intention to Use	2	Mean	Criterion/Explanatory
Actual Use	4	Mean	Criterion
Total Variables	**18**		

f. Ethical Considerations

A self-explanatory note stating the purpose and procedures of the study was given to the participants before obtaining their personal consent to participate in the study. In addition, the following steps were taken:

(i) The questionnaire contained no personal identifiable information such as name or telephone of the participant to ensure that answers to these questions remain confidential, particularly without being linked back to the identity of the participant.

(ii) A deliberate attempt was made to keep the questionnaire as short as possible to avoid overburdening the respondents.

(iii) It was made clear to the respondents that their participation was voluntary and, thus, they had an option of withdrawing from the survey at any time if they so wished.

4. Results – Demographic Features

Data analysis starts with preliminary examination of the demographic features of the respondents and evaluation of the appropriateness of the chosen analytical model. The subsequent main data analysis deals with the study's subject matter.

a. Characteristics of the Sample

Table 2 shows the descriptive statistics relating to the demographic characteristics of the study's respondents. These characteristics enable the reader to reflect on the general features of the individuals upon whom the findings and conclusions of this study have been based. The typical respondent, as per our sample, was male (65%) and was a conventional student (80%) as opposed to the block student. The proportion of young students (year one and two) was somewhat higher at 56% than that of seniors (year three and four) at 44%.

Table 2. Characteristics of the Respondents

Sex:	No.	%
Male	218	65%
Female	119	35%
Total	**337**	**100%**
Mode of study:		
Block	67	20%
Conventional	270	80%
Total	**337**	**100%**

Year of study:	No.	%
First	82	24%
Second	107	32%
Third	39	12%
Fourth	109	32%
Total	**337**	**100%**

b. Reliability of the Subject Matter Variables

According to Merriam Webster dictionary, "reliability is the extent to which an experiment, test, or measuring procedure yields the same results on repeated trials". Since Perceived Usefulness, Perceived Ease-of-Use, Intention and Use is an assembly of interrelated items designed to measure an underlying construct, the study ensured that the set of items used in the study measure the true construct. Although the TAM model has already been validated by its authors, this study re-examined the validity of the instrument to ensure its reliability in the specific context of this study.

Generally, Cronbach alpha is commonly used as an estimate for the reliability of a psychometric test (Cronbach, 1970) and is reportedly one of the most reliable estimates (Brown, 2002). Cronbach alpha ranges from 0 to 1. The scale used in this study had good reliability as the overall Cronbach's alpha for the scale is 0.63. This means that the instrument is fairly good in measuring the underlying constructs. By convention, a lenient cut-off of 0.60 is common in exploratory research (Malhotra, 1996); in normal circumstances alpha should be at least 0.70 (Nunnaly, 1967; Churchill, 1979) or higher. In fact, some researchers require a cut-off of 0.80 for a "good scale" (Reliability Analysis, 2007).

5. Results: Testing Hypotheses

In line with good practice, the study computed the descriptive statistics of the variables used to measure the subject matter variables employed in the research project to get a feel for the data before addressing the research questions or testing the hypotheses.

a. Descriptive Statistics

Tables 3 and 4 display the descriptive statistics relating to the subject matter measures or variables. The mean and standard deviation of all the 18 test items and the TAM constructs are displayed. The mean values depict the average responses from the respondent whereas the standard deviation values show the amount of variation in the data. Whereas a standard deviation value close to 0 indicates the closeness of the data points to the mean, high standard deviation indicates the spreading out of the data points. Whereas Table 3 portrays the descriptive statistics of the TAM constructs, Table 4 displays detailed descriptive statistics of all the test items:

Table 3. Descriptive Statistics of the Constructs

Construct	Mean	Std. Deviation
Perceived Usefulness	3.58	0.752
Perceived Ease-of-Use	3.00	0.800
Behavioural Intention	4.04	0.995
Behavioural Use	3.73	0.738

Table 4. Descriptive Statistics of Test Items under each TAM construct

Test Items	Mean	Std. Dev.
Perceived Usefulness:	**3.58**	**0.752**
I find digital technologies useful for learning	3.74	1.278
Digital technology increases chances of getting information necessary for assignments	3.83	1.160
Use of the digital resources enables me to accomplish tasks quickly	4.05	1.090
If I use digital platforms, my chance for passing exams is improved	3.58	.776
BUSE has enough digital marketing technologies for my studies	2.58	1.203
I believe that the digital platforms are a very efficient study tool	4.18	.950
Perceived Ease-of-Use:	**3.00**	**0.800**
Digital notes and handouts are user friendly	3.19	1.282
I find help on how to study online when using digital platform	2.36	1.247
The platform for online learning is understandable	2.68	1.388
It is easy for me to upload my assignments on e-learning platform	3.26	1.245
The use of mobile gadgets in learning is convenient for me	2.75	1.285
The University website is easy to use	3.61	1.108
Behavioural Intention:	**4.04**	**0.995**
I intend to use the provided digital learning technology in the near future.	4.21	.853
I would consider influencing other students to use the digital learning technology provided in the near future.	4.14	1.010
Behavioural Use:	**3.73**	**0.738**
I use digital notes when learning	4.48	.572
I use the University website for learning purposes	3.71	.997
I use the University electronic library	3.81	1.163
I use mobile devices for learning purposes	3.21	1.075

b. Preparing to Test of Hypotheses 1 and 2: Multiple Regression

After the above preliminary analyses, Multiple Linear Regression analysis was performed to test the significance of the various constructs of the TAM in measuring the behavioural intention of students to adopt and use e-learning. One of the assumptions of regression analysis is that there is no multicollinearity among the independent variables included in the model. Multicollinearity refers to a situation in which some or all of the explanatory variables are highly inter-correlated. If this happens, it implies that the independent variables affect each other. The problem with multicollinearity is that when some or all the variables are highly collinear one cannot isolate their individual influence on the criterion variable.

Collinearity is often suspected when correlation is high, say, between 0.7 and 1.0 (Gujarati, 1978). The Pearson correlation coefficients among the two explanatory factors show that the inter-correlations between Perceived Usefulness and Perceived Ease-of-Use is medium low, at 0.343 (Table 5), suggesting that collinearity is not a serious problem in this data. After this preliminary preparatory data analysis steps, we now turn to the main analyses.

Table 5. Pearson Correlation between Usefulness and Ease-of-Use

	Perceived Usefulness	Perceived Ease of Use
Perceived Usefulness	1	
Perceived Ease of Use	0.343	1

c. Testing Hypotheses 1 and 2 – Multiple Regression

A multiple linear regression was performed to evaluate the predictive power of the constructs contained in the Technology Acceptance Model. The findings (Table 6) reveal the following:

1. First, the F significance level shows that the regression equation, as a whole, has a statistically significant predictive capability, thus making it worth studying the other aspects of the equation.

2. Second, the beta coefficient for Perceived Usefulness was positive as hypothesised, and low at 0.216, but was statistically significant. This suggests that Perceived Usefulness has a weak positive relationship with Intention.

3. Third, the beta coefficient for Perceived Ease-of-Use was negative which is contrary to hypothesis, very low at -0.065 and was not statically significant.

4. Fourth, the R^2 value of 0.023 tells that the regression equation had low explanatory power as the two predictors explained only about 2.3% of the variation in Intention to use e-learning technologies.

5. Fifth, although the beta coefficients and *R^2 are small*, these results were statistically significant with regard to Perceived Usefulness and thus consistent with the theory informing the study, in the sense that Perceived Usefulness contributed positively and significantly to the prediction of Intention to use e-learning technologies.

6. Finally, for predictive purposes, the regression equation shows that the participants' predicted INTENTION was equal to 3.462 + 0.216 (Perceived Usefulness) - 0.065 (Perceived Ease-of-Use), where Intention, Usefulness and Ease-of-Use are all coded as 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree. The participants' **Intention** increased by 0.216 points on the 5-point Likert scale for each point increase in Usefulness. On the other hand, Intention decreased by -0.065 for each point increase in **Ease-of-Use**. **Perceived Usefulness** was in the expected direction and a significant predictor of Intention. The Perceived Ease-of-Use was contrary to the hypothesis, and was not a statistically significant predictor of Intention.

Table 6. Multiple Regression – Predicting Intention

Predictors	Intercept	Beta	Predicted	R Square	F-value	F-prob.	t- value	t- prob.
Perceived Usefulness	3.462	0.216	Intention to Use E-Learning Technologies	0.023	4.008	0.019	2.830	0.005*
Perceived Ease-of-Use		-0.065					-0.910	0.364

* = Significant

d. Testing Hypotheses 3 – Simple Regression of Actual Use on Intention

A simple linear regression was calculated to predict Actual Use of e-Learning technologies based on Intention. The findings (Table 7) made the following revelations:

1 Intention was a significant predictor of the dependent variable, Actual Use.

2 Compared to Perceived Usefulness whose beta coefficient was 0.216, that for Intention increased to 0.251, hence suggesting that Intention has a slightly relatively stronger positive relationship with Actual Use.

3 When Intention was regressed on the twin predictor variables of the TAM, it produced an R^2 of 2.3%; however, when Actual Use was regressed on Intention, theR^2 increased fivefold to 11.5%.

4 Overall, this analysis suggests that, as expected, Intention has a positive and a relatively powerful influence on the students' actual use of e-Learning technologies.

Table 7. Simple Regression – Intention Predicting Actual Use

Predictor	Intercept	Beta	R Square	F-value	F-Pro.	T- Value	T-Prob.	Predicted
Intention	2.712	0.251	0.115	43.443	0.000	6.591	0.000*	Actual Use

* = Significant

6. Summary, Conclusions, Implications, Limitations, Future Research

This section ties together the entire study. First, it presents a summary of the key findings. Second, it translates the key findings into a meaningful set of conclusions. Third, it discusses the implications for practice and theory based on these conclusions. Finally, it advances suggestions for future research.

a. Summary

This work aimed to investigate the factors that influence intention and actual use of digital learning technology based on constructs adopted from the Technology Acceptance Model. Thus, the study set out to test three hypotheses relating to the basic technology acceptance model and these are:

1. **Hypothesis 1: P**erceived **U**sefulness **(PU)** has positive influence on students' **B**ehavioural **I**ntention (**BI)** to use e-learning technologies**.**

2. **Hypothesis 2: P**erceived **E**ase-of-**U**se (**PEU**) has positive influence on students' **B**ehavioural **I**ntention (**BI)** to use e-learning technologies**.**

3. **Hypothesis 3: B**ehavioural **I**ntention (**BI)** has a positive and a powerful influence on students' **A**ctual **U**se of e-learning technologies **(AU).**

Table 8 summarises the outcome of testing the hypotheses including their statistical significance. The statistical results affirm that the Perceived Usefulness (p value = **0.005**) and Behavioural Intention (p value = **0.000**) had significant regression weights, indicating that the hypotheses (claims) H1 and H3 are accepted. This goes to support the hypothesis that PU influences students' **Behavioural Intention (BI)** and BI in turn influences **Actual Behaviour.** Meanwhile, the remaining construct PEU (p value = 0.364) is rejected as it was found to be statistically insignificant.

Table 8. Summary of the Research Outcomes

Hypothesis			P value	Significance	Remarks
H1:	→	BI	0.005	Significant	H1 Accepted
H2:	→	BI	0.364	Not Significant	H2 Rejected
H3:	→	AU	0.000	Significant	H3 Accepted

b. Conclusions

1. Overall, the use of the TAM in this context has been partially successful, for two of the three hypotheses tested have been supported by the results, hence indicating the robustness of the model and its value in understanding students' intention and use of technology. Usefulness appears as an important driver for intention to use e-technology in education. It appears students have clear requirements in terms of technology enabling them to produce more in the limited time at their disposal and attain more effectiveness. Thus, the benefits expected from digital technology motivate students to use it. In this regard, students believe that using digital technology in learning would enhance their academic performance; it would help them accomplish tasks quickly in addition to enriching learning. Therefore, perceived usefulness is significant in explaining variation in intention to adopt e-learning technology among students.

2. These findings lend credence to the widely-held belief or hypothesis of a direct and a strong relationship between intention to behave and actual behaviour. In fact, there is substantial theoretical support for the intention-behaviour link. In the context of TAM, there is evidence that intention is directly related to behaviour (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989).Similar results have been found for the Theory of Planned Behaviour (Ajzen & Madden, 1986).In the same vein, the Theory of Reasoned Action (TRA), on which both TAM and TPB are based, proposes a strong intention-behaviour link. The combined theoretical and empirical findings suggest that studies that use intention as a proxy for actual behaviour and forego the more difficult measurement of the actual behaviour do not necessarily introduce a serious limitation in the validity of the studies.

c. Implications

This study makes both theoretical and managerial contributions. In theoretical terms, the research provides evidence for the predominance of Perceived Usefulness over Perceived Ease-of-Use in predicting intention to adopt e-learning among students.

In practical terms, both marketers of e-learning applications and institutions of higher learning bent on adopting e-learning technologies can use the outcome of this research as a valuable input when designing strategies aimed to enhance e-learning diffusion. By understanding the key factor that determines adoption, they can respectively develop better marketing strategies and manage better e-learners. The study also provides insights into how to ensure students use particular technologies for a given course of study. In this regard, a useful system must be put in place. After all, evidence in this study suggests that of the two factors that are hypothesised to influence intention to use e-learning technologies, perceived functionality plays a dominant role. As such, technologies, which do not meet this condition, may simply be ignored.

d. Limitations and Future Research

1. The current study focused on students in only one university; therefore, it has not covered students in other universities. Other researchers interested in digital adoption and tertiary learning, particularly in the developing countries' context, could expand the target population to include more universities at the same level of digital technology implementation. Implicitly, future research should address more institutions to be more representative and for the generalisation of the results.

2. This study covered students only. As such, future research may focus on lecturers, another user group in need of heightened adoption of technology to foster e-teaching, which could have a spill-over effect on the students' e-learning. After all, teaching and learning go together.

3. Lastly, the current study employed the basic formulation of the TAM model. It would be interesting to undertake a study designed to compare and contrast the predictive power of the different competing theories such as TAM, TRA, TPB, and UTAUT.

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