

## THE ADOPTION OF DIGITAL TEXTBOOKS IN DISTANCE LEARNING

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### **Abstract**

In recent years, the widespread adoption of digital textbooks has revolutionized the way students access educational content. Technology has advanced quickly, and as a result, textbooks are now available to students worldwide in digital form, which has improved their overall academic performance. This modification is acceptable for the sustainable learning program, where students have access to materials from anywhere and at any time and digital textbooks promote online learning. This study intends to examine the variables influencing elementary distance learner students' intentions to adopt digital textbooks. Structured equation modeling (SEM) was used to evaluate quantitative data from 316 higher education students in Indonesia. According to the findings, students' intentions to use digital books were positively impacted by facilitating condition (Conway & Huffcutt), performance expectancy (PE), self-efficacy (SE), and perceived learning opportunities (PLO). However, attitude, affective, ICT usage habits, effort expectancy, and social influences did not affect students' intention to use digital textbooks. This research provides important information for the government, decision-makers, and schools on using digital textbooks at the tertiary level in the future.

Keywords: Digital textbook, UTAUT, Behavior Intention

### **1 INTRODUCTION**

The acceptance and use of digital textbooks have become increasingly important in the context of distance learning. As more students engage in remote education, understanding the factors that influence their acceptance of digital textbooks is crucial for effective implementation and improved learning outcomes. This literature review aims to explore the extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) to understand the acceptance of digital textbooks among distance learning students.

The UTAUT is a widely recognized theoretical framework that explains individuals' acceptance and use of technology. It incorporates several key factors, including performance expectancy, effort expectancy, social influence, and facilitating conditions, which have been found to significantly impact technology adoption (Venkatesh et al., 2003). Extending this theory to the context of digital textbooks for distance learning students allows for a comprehensive understanding of the factors influencing their acceptance.

Performance expectancy refers to the perceived usefulness and benefits of using digital textbooks in distance learning. Research has shown that students' perception of the effectiveness of digital textbooks in enhancing their learning outcomes positively influences their acceptance (N. Ngafeeson & Sun, 2015). Distance learning students may perceive digital textbooks as providing interactive features, multimedia integration, and easy access to learning materials, which can enhance their engagement and understanding (Morchid, 2019).

Effort expectancy relates to the perceived ease of use and simplicity of digital textbooks. Students' perception of the user-friendliness and accessibility of digital textbooks significantly influences their acceptance (N. Ngafeeson & Sun, 2015). Distance learning students may value the convenience of accessing digital textbooks anytime and anywhere, as well as the ease of navigating through digital content (Morchid, 2019).

Social influence plays a crucial role in the acceptance of digital textbooks among distance learning students. Peers, instructors, and institutional norms can influence students' attitudes and intentions to use digital textbooks (Shiferaw et al., 2021). Positive recommendations from peers and instructors, as well as institutional support and encouragement, can enhance students' acceptance and adoption of digital textbooks (Mujalli et al., 2022).

Facilitating conditions encompass the availability of necessary resources, technical support, and training for using digital textbooks in distance learning. Students' perception of the adequacy of these facilitating conditions significantly influences their acceptance (N. Ngafeeson & Sun, 2015). Access to reliable internet connectivity, compatible devices, and technical assistance can enhance students' acceptance and usage of digital textbooks (Mujalli et al., 2022).

In addition to the UTAUT factors, other variables may also influence the acceptance of digital textbooks among distance learning students. For example, individual characteristics such as prior experience with technology, self-efficacy, and personal innovativeness can impact students' acceptance (Morchid, 2019). Furthermore, factors such as perceived learning opportunities, instructional support, and the alignment of digital textbooks with students' learning preferences and needs can also influence their acceptance (Jevsikova et al., 2021).

Extending the UTAUT to understand the acceptance of digital textbooks among distance learning students provides valuable insights into the factors influencing their adoption. Performance expectancy, effort expectancy, social influence, and facilitating conditions, along

with individual characteristics and contextual factors, play significant roles in students' acceptance of digital textbooks. By considering these factors, we aim to determine the factors that influence the intention of distance learning students to use digital textbooks. We also intend to investigate whether demographic information, such as faculty, region, and package system level, affects students' behavior and intention to use digital textbooks. By understanding these factors, educational institutions and policymakers can develop strategies to promote the effective integration of digital textbooks in online classroom.

## 2 METHODOLOGY

This research aims to use the results of the extended UTAUT model to measure students' intention to use digital textbooks as learning media at the distance learning. This model incorporates technical factors capable of affecting the intention of students to use technology-based learning media.

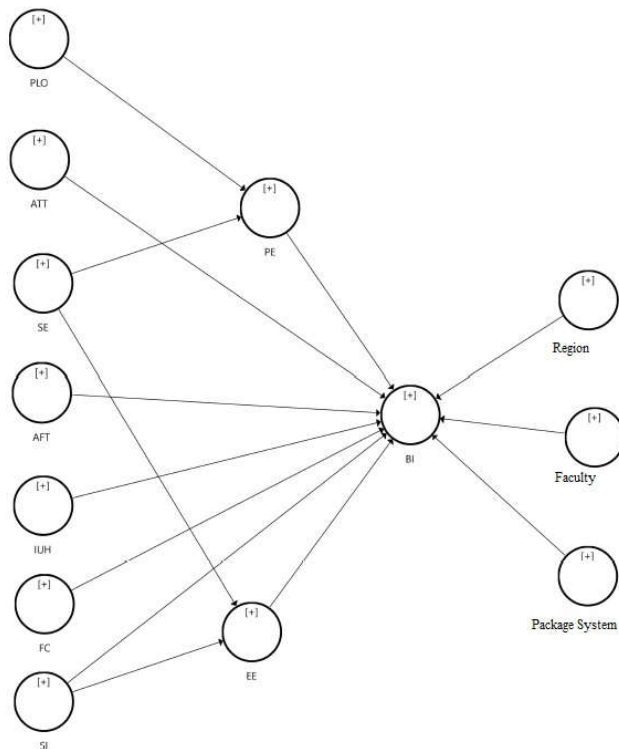


Figure 1. The Proposed Modified UTAUT Model

### 2.1 Research approach

The questionnaire was designed by adopting several sources to measure the proposed model and test the hypotheses. The review shows that the questionnaire survey is the most widely used instrument to analyse the intention and acceptance of the model in technology. The questionnaire in this research was divided into 2 parts; the first contains demographic

participants, and the second consists of 26 questionnaires based on the UTAUT model. The 5-point Likert scale was selected based on popularity and is considered one of the best scales to measure questionnaire responses and ranged from 1 = strongly disagree to 5 = strongly agree. A language specialist translated the original English-language questionnaire into Indonesian to ensure accuracy. The translation was re-checked by an expert with sufficient English and Indonesian language skills.

#### *2.1.1 Perceived learning opportunities*

Perceived learning opportunities are defined as the degree to which individuals believe that using digital textbooks in teaching and learning activities can increase their opportunities to learn new teaching models or methods (Hermita et al., 2023). Digital textbooks have a better future than the traditional, which led to the following initial hypothesis:

*H1: Perceived Learning opportunities (PLO) affects performance expectancy (PE).*

#### *2.1.2 Attitude*

Attitude (ATT) is defined as the degree of an individual's positive experience, such as interest and enjoyment towards the use of new technology (Venkatesh et al., 2003). In the UTAUT model, attitude is predicted to directly affect behaviour intentions towards using ICT as a variable.

*H2: Students' attitudes toward digital textbooks affect students' intentions to use digital textbooks.*

#### *2.1.3 Self-efficacy*

Self-efficacy (EFF) is defined as individuals' beliefs likely to affect the intention to use technology (Bandura, 1986), such as digital textbooks. Therefore, it is suspected to have an influence on students' opinion on the performance and effort expectancies. Based on this explanation, the following hypotheses were formulated:

*H3: self-efficacy affects performance expectancy (PE).*

*H4: self-efficacy affects effort expectancy (EE).*

#### *2.1.4 Affective need*

The affective need (AN) is primarily defined as the experience of an individual's feelings or emotions (Shukla, 2021). Affective learning is associated with the attained knowledge and psychomotor skills mindset, views, and values. In addition, Shukla (2021) reported that

effective needs affect the intention to use technology. Therefore, it led to the following hypothesis:

*H5: Affective need (AN) affects students' intention to use digital textbooks (BI).*

#### *2.1.5 ICT usage habits*

Habit is defined as a routine of previous behaviour, which measures an individual's tendency to perform a behaviour automatically because of learning developed by Venkatesh et al. (2012) on UTAUT2. In this research, habit is more about the experience and the existing situation of elementary school teachers using digital textbooks. This led to the formulation of the following hypothesis:

*H6: ICT usage habits affect students' intention to use digital textbooks (BI).*

#### *2.1.6 Facilitating conditions*

Facilitating conditions is the degree to which individuals believe that the environment supports them to use technology. In recent research, FC was used to predict both BI and usage behaviour (UB). The first version of the TAM model did not consider FC against UB (Venkatesh et al., 2003). However, the extensions in the UTAUT model show FC to be a valuable addition and this led to the following hypothesis:

*H7: Facilitating condition affects students' intention to use digital textbooks (BI).*

#### *2.1.7 Social influence*

Social influence is the degree to which an individual is convinced to use technology from important people (Venkatesh et al., 2003). It is an important factor used to predict an individual's intention and acceptance to use technology in both the UTAUT and BI models (Wijaya et al., 2022). Social influence in previous studies has also been shown to affect EE (Shiferaw et al., 2021). This led to the formation of the following hypothesis:

*H8: social influence (SI) affects students' intention to use digital textbooks (BI).*

*H9: social influence (SI) affects effort expectancy (EE).*

#### *2.1.8 Effort expectancy*

Effort expectancy analyses the difficulty level of using new technology, in accordance with (Venkatesh et al., 2003) analysis subjectively. In the UTAUT model, EE is predicted to directly affect behaviour intention, which is affected by self-efficacy, where the higher it is, the easier

the use of new technology. EE is defined as when students feel that digital textbooks are easy to use for teaching and do not require much effort. This led to the following hypothesis:

*H10: Effort expectancy (EE) affects students' intention to use digital textbooks (BI).*

#### *2.1.9 Performance expectancy*

Performance expectancy focuses on determining an individual's ability to use the new technology to achieve their desired goals. Venkatesh et al. (2003) defined PE as the degree to which people believe that new technology can help them complete their tasks more effectively and efficiently.

*H11: Performance expectancy (PE) affects students' intention to use digital textbooks (BI).*

#### *2.1.10 Digital textbooks behaviour intention*

Behaviour intention (BI) is defined as an individual's potential to intensely execute a specific behaviour (Venkatesh et al., 2003), empirically verified as a significant determinant of many behaviours (Shukla, 2021), including the use of new technologies. Behavioral intention represents internal orientation symbolizing belief structure or schema to perform a targeted behaviour.

The proposed model contains a total of 11 hypotheses, as shown in Figure 1.

#### *2.1.11 Region, faculty, and package system for moderator effect*

This research examines three types of demographic information capable of influencing students' intention to use digital textbooks for learning, namely region, faculty, and package system (package system or non-package system). It is expected that this additional test will provide a deeper understanding based on actual integration. According to numerous preliminary research, there is a relationship between demographic information and technology integration.

## **2.2 Sampling and data collection**

The survey was carried out in the even semester of the 2022–2023 academic year. The primary sample were distance learning students of higher education institution in Indonesia, who had used digital textbooks. Online questionnaires were distributed via WhatsApp groups and through email to fill out the questionnaire voluntarily and without repetition. Of the more than 1.500 respondents from different age groups, gender, education levels, in the end, only 316 responses were valid and used for further analysis.

### **2.3 Instrument**

The questionnaire as a research instrument was divided into two, with the first section containing questions to collect demographic data of respondents. Meanwhile, the second section contained questions to determine the factors affecting the intention of elementary school teachers in Riau to use digital textbooks adapted from previous studies by (Morchid, 2019). A total of 35 items are carefully modified according to the context of this research using a 5-point Likert scale ranging from 1 to 5.

### **2.4 Data Analysis**

Smart PLS is used to perform a structural equation model (SEM) approach to path analysis and test the hypothesized relationships of the full structural model. According to Kline (2005), the sample size required for SEM is at least 200. This research was conducted using a sample of 316 respondents; hence it can be said that it has a surplus size. The analysis evaluated the correlation between PE, EE, SI, FC, ATT, BI, UB, and the previously predicted variables.

## **3 FINDINGS AND DISCUSSION**

Structural equation modelling (SEM) techniques were used to analyse the data and test the hypotheses. The analysis was performed using the two-step approach developed by Anderson and Gerbing (1988). The first step involved assessing the validity and reliability of the measurement model while the second step involved analysing the structural model to test the research hypotheses.

### **3.1 Evaluating the measurement model**

This research used convergent validity to measure the (a) item reliability, (b) composite reliability, and (c) average variance extracted (AVE). The values of item reliability in Table 1 show that all constructs of Cronbach's alpha value are greater than the threshold limit of 0.70 (Hair et al., 2009) with the smallest FC of 0.81. The loading factor used in this research was more than 0.8, thereby indicating that all items can be used for further analysis (Hair et al., 2009). For composite reliability, Table 1 show that all construct value was more than 0.7, indicating high internal consistency reliability among the latent variables (Fornell & Larcker, 1981). Ultimately, the analysed variances of the AVE have a value more than 0.5. Therefore, it can be concluded that this research meets the criteria of convergent validity (Fornell & Larcker, 1981).

*Table 1. Loading factor, validity, and reliability of measurement model*

No.	Latent: Variable	Standard Loading	Composite Reliability	Average Variance Extracted (AVE)
	<b>Attitude</b>		0,986	0,89
1	ATD1	0,83		
2	ATD2	0,91		
3	ATD3	0,94		
4	ATD4	0,98		
	<b>Affective</b>		0,973	0,84
5	AFT1	0,89		
6	AFT2	0,84		
7	AFT3	0,86		
8	AFT4	0,94		
	<b>ICT Usage Habits</b>		0,995	0,93
9	IUH1	0,95		
10	IUH2	0,95		
11	IUH3	0,94		
	<b>Perceived Learning Opportunities</b>		0,989	0,90
12	PLO1	0,88		
13	PLO2	0,90		
14	PLO3	0,93		
15	PLO4	0,95		
	<b>Self-Efficacy</b>		0,979	0,86
16	SE1	0,94		
17	SE2	0,93		
18	SE3	0,89		
19	SE4	0,84		
	<b>Performance Expectancy</b>		0,996	0,94
20	PE1	0,96		
21	PE2	0,96		
22	PE3	0,95		
	<b>Effort Expectancy</b>		0,986	0,88
23	EE1	0,89		
24	EE2	0,93		
25	EE3	0,90		
	<b>Social Influences</b>		0,979	0,86
26	SI1	0,87		
27	SI2	0,92		
28	SI3	0,94		
29	SI4	0,82		
	<b>Behavior Intention</b>		0,981	0,87
30	BI1	0,89		
31	BI2	0,92		



No.	Latent: Variable	Standard Loading	Composite Reliability	Average Variance Extracted (AVE)
32	BI3	0,89		
	<b>Facilitating Condition</b>		0,954	0,80
33	FC1	0,83		
34	FC2	0,92		
35	FC3	0,81		

Table 2. Goodnes of Fit Indices Model

Index	Criteria	Model
Root Mean Square Error of Approximation (Vivekananthamoorthy et al., 2016)	< 0,08	0.028
Standardized Root Mean Square Residual (Tavukcu et al., 2011)	< 0,08	0.044
Normed Fit Index (NFI)	> 0.80	0.99

The model has a value of RMSEA = 0.028, SRMR = 0.044, and NFI = 0.99. Therefore, the model reasonably fits the data and can be used for structural analysis.

### 3.1.1 Structural model and hypotheses testing

The next step was to test the structural model (Fig. 2). Structural equation modelling (SEM) is a comprehensive tool employed to test the hypothesised relationships between variables (Hair et al., 2009), which in this study were the relationships between UTAUT factors, behavioural intentions, and usage of digital textbook. Figure 2 shows the final structural model that result from applying the refinement criteria mentioned in measurement model section that contains 35 items. The overall model was then examined. Based on the analysis of the structural model, frequently used measures of model fit are summarised in Table 3, the results of which indicate an acceptable fit to the data. Based on the results obtained using SPSS version 27 software, the final model can be expressed by two equations using nonstandardised regression coefficients:

$$PE = 0.38*FC + 0.52*SE, R^2 = 0.75$$

$$EE = 0.40*SE + 0.54*SI, R^2 = 0.79$$

$$BI = 0.28*PE+0.078*EE+0.17*ATDF-0.074*AFT-0.068*IUH+0.12*SI+0.54*FC, R^2= 0.92.$$

In these structural equations, the path values are the regression coefficients. For example, 0.21 (1-R<sub>2</sub>, where R<sub>2</sub> is the coefficient of determination) is the error variance in the second equation.

This model explains approximately 79% of the variance in behavioural intentions and 79% of the variance in actual usage. This is relatively high, albeit below the level of 70% suggested by Venkatesh et al. (2003).

Table 3 presents a summary of the supported and non-supported hypotheses. Perceived Learning Opportunity (PLO) and Self Efficacy significantly affected students' behavioural intentions to use digital textbook. Social influence did not significantly affect students' behavioural intentions to use digital textbook. Facilitating conditions and Performance Expectancy significantly affected students' usage of digital textbook.

*Table 3. Summary of Hypotheses*

No.	Hypothesis	Path	Estimate	S.E.	t	P	Result
1	PLO will affect the PE	PLO --> PE	0,38	0,17	2,28	0,0233	Supported
2	SE will affect the PE	SE --> PE	0,52	0,16	3,19	0,0016	Supported
3	SE will affect the EE	SE --> EE	0,40	0,13	2,98	0,0031	Supported
4	SI will affect the EE	SI --> EE	0,54	0,12	4,38	0,0000	Supported
5	ATD will affect the BI	ATD --> BI	0,17	0,16	1,12	0,2636	Not Supported
6	AFT will affect the BI	AFT --> BI	-0,074	0,18	-0,41	0,6821	Not Supported
7	IUH will affect the BI	IUH --> BI	-0,068	0,091	-0,74	0,4599	Not Supported
8	SI will affect the BI	SI --> BI	0,12	0,16	0,72	0,4721	Supported
9	FC will affect the BI	FC --> BI	0,54	0,14	3,87	0,0001	Supported
10	PE will affect the BI	PE --> BI	0,28	0,077	3,67	0,0003	Supported
11	EE will affect the BI	EE --> BI	0,078	0,11	0,73	0,4659	Not Supported

*Note: S.E. = Standard of Error; t = Critical ratio of t test; P = Probability value under null hypothesis*

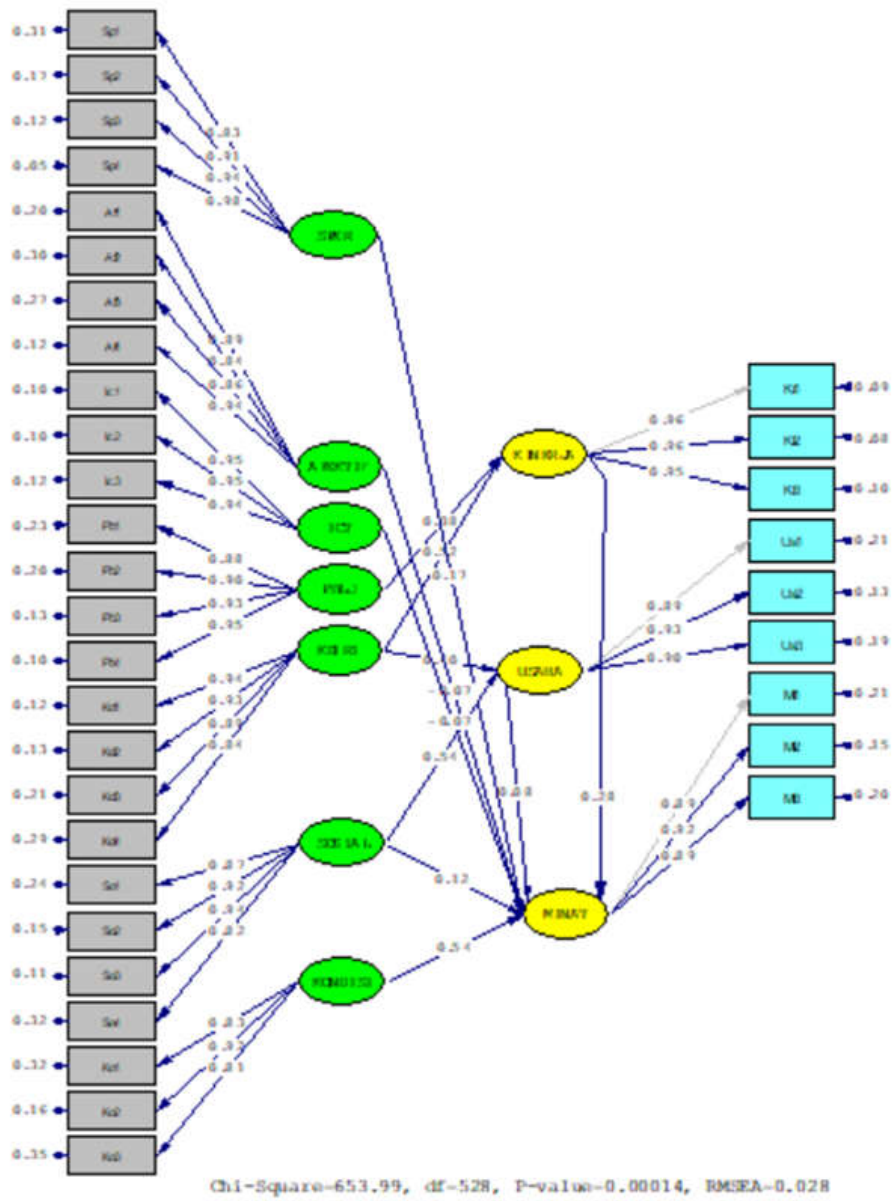


Figure 2. Estimated Model

3.1.2 The Structural equation model

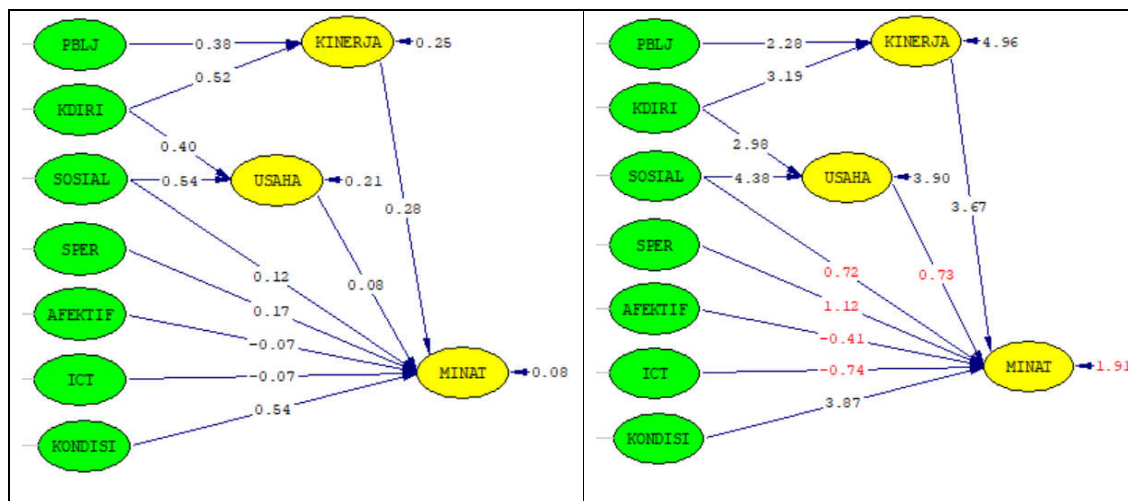


Figure 3. Structural equation model (Ertmer & Ottenbreit-Leftwich) and t statistics (right)  
 (Note: red t-statistics indicate insignificance)

Model analysis based on Table 3 and Figure 3:

1. The factors Self-Efficacy (0.52) and Perceived Learning Opportunities (0.38) have an effect on Effort Expectancy and Effort Expectancy have an effect (0.28) on Behavior Intention.
2. Social Influence factors (0.54) and Self-Expectancy (0.40) affect Effort Expectancy, but Effort Expectancy has no effect on Behavior Intention.
3. The Perceived Learning Opportunities factor has an effect on Behavior Intention (through Performance Expectancy) of  $0.38 \times 0.28 = 0.1064 \approx 0.11$ .
4. The Self-Efficacy factor has an influence on Behavior Intention (through Performance Expectancy and Effort Expectancy) of  $(0.52 \times 0.28) + (0.40 \times 0.08) = 0.1456 + 0.04212 = 0.18772 \approx 0.19$ .
5. The Facilitating Condition factor has an effect (0.54) on Behavior Intention, while the effect of the other four factors (Social Influences, Attitude, Affective Need and ICT usage habit) on Behavior Intention is not significant.
6. Thus, overall, Behavior Intention is influenced, from the most dominant, by the factor : Facilitating Conditions (0.54), Performance Expectancy (0.28), Self-Efficacy (0.19), and Perceived Learning Opportunities (0.11).

#### 4 CONCLUSION

This research used the UTAUT model as a theoretical framework to determine the extent of self-efficacy, ICT usage habits, performance learning outcomes, affective needs, and attitudes toward using digital textbooks by Venkatesh et al. (2003) in the study of the acceptance of e-books among readers of the distance learning students of higher education in Indonesia, verifying that the model is not valid for digital textbook adoption.

Finally, due to the novelty of digital textbooks and low adoption at the tertiary school level, this research was unable to test whether behavior intention in this context leads to actual use. Digital textbooks in Indonesia are still in the development stage therefore, future research needs to investigate whether students' intention facilitates its actual use at the higher education level.

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