

# The Impact of Tablet Use on the Academic Performance of Students in the Faculty of Applied Sciences and Technology

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## Abstract

The use of digital devices has increased especially in education field. The Malaysia's Ministry of Education has launched a program called PerantiSiswa Keluarga Malaysia to provide tablets for students from B40 families for pursuing higher learning. Lack of instructor supervision, network environment instability, and distractions from social media can all cause issues with focus. Thus, this study examines the correlation between tablet usage and demographic characteristics among Faculty of Applied Sciences and Technology (FAST) students by using Chi-square test, tablet use relationship with academic performance by using Cross-tabulation and Cramer's V, and the factors influencing tablet use in education by using factor and path analysis. A survey of 218 respondents revealed that tablet usage has correlation with gender, programme, household income group, and PerantiSiswa recipients. Furthermore, the finding shows that the cumulative grade point average (CGPA) has the strongest relationship with tablet use for study, fully attention in class has strongest relationship with time spent on tablet, and time management has strongest relationship with tablet application. Six factors influencing tablet use in education were identified among 25 variables which are the academic performance, motivation, enjoyment, social support, educational utility, and communication. The connection between these six factors is analysed by using the path analysis and the result confirmed that all factors had impact on motivation and enjoyment of using tablet. In conclusion, tablets have potential to change the way learning in education, but how effective the impact can be seen on the student's academic performance. In future studies, it should consider all faculties in UTHM and investigate the impact of PerantiSiswa on students' learning outcomes.

## 1. Introduction

The use of personal gadgets for learning in a variety of contexts while keeping connected to media, teachers, students, researchers, and others worldwide is known as mobile learning [1]. Students may now access educational resources more conveniently than ever before, and teachers can use a wide range of internet resources to create lesson plans [2]. A program called PerantiSiswa Keluarga Malaysia, introduced by Ministry of Education in 2022 provide tablets to students from B40 families pursuing higher learning. The goal is to reduce the cost of tablets for B40 students and help close the digital divide [3].

The acceptability of mobile learning among students is influenced by factors like awareness, resource accessibility, and system compatibility, which are crucial for successful implementation in higher education [4]. Tablets allow students to remain in control of their education and easily move from formal to informal, personal to social learning environments [5]. It encourages students to interact with gadgets and keeps their motivation and attention in learning.

Mobile technologies offer advantages in learning but also have negative impacts. Instabilities in network environments [6], lack of instructor monitoring [7], and distractions from unfocused behaviours like social media and internet communication [8] can lead to lost focus. Additionally, students may struggle to balance reading educational material with other enjoyable activities [9]. To effectively use mobile technologies, it is crucial to address these issues and investigate the relationship between tablet use and academic performance. Therefore, investigating these relationships may help determine the beneficial or negative impact of mobile learning.

The aim of this study is to determine the relationship between tablet usage and demographic characteristics among Faculty Applied Sciences and Technology (FAST), Universiti Tun Hussein Onn Malaysia (UTHM) students by using Chi-square test, to study relationship between tablet usage with students' academic performance by using Cross-tabulation analysis and Cramer's V, and to identify the factors influence students on using a tablet for learning by using factor analysis and path analysis. Furthermore, this study helps students decide whether to buy a tablet or continue with pen and paper for education, assisting them in making informed decisions for better academic performance and results.

## 2. Methodology

### 2.1 Survey Instrument

An online survey conducted using the Google Form, with undergraduate students from seven programs in the FAST, UTHM as respondents, including Mathematics Technology (BWA), Applied Physics (BWC), Food Technology (BWD), Industrial Chemistry (BWK), Industrial Statistics (BWQ), Computational Data Analytics (BWS) and Biodiversity & Conservation (BWW).

### 2.2 Sampling Technique

This study utilized convenience sampling to gather data from FAST, UTHM undergraduate students. Convenience sampling is the process by which the researcher chooses the participants for the study group by considering factors like convenience and accessibility [10]. This suggests that the investigator mainly obtains data from individuals who are readily identifiable and reachable. Participants were chosen based on their accessibility, availability, or willingness to participate via social media platforms.

### 2.3 Sample Size

Determining the sample size involves selecting the right number of respondents from a larger group to include in a sample, as incorrect size can lead to incorrect findings [11]. Convenience sampling does not follow a particular method for calculating sample size, and practicality and convenience considerations are usually given preference over statistical considerations [12]. Therefore, there is no set formula for figuring out the survey's sample size.

### 2.4 Pilot Study

Pilot studies are essential for determining feasibility, sample size, and resource efficiency, and ensuring the reliability and validity of questionnaires [13]. Conducting pilot studies is a crucial initial step towards verifying the efficacy of the methods and procedures to be employed in a more comprehensive study [14]. Thus, the questions on the questionnaire must be checked for validity and reliability before being distributed out to participants.

### 2.5 Reliability Test

Reliability tests are essential for questionnaire creation and validation to ensure consistency and reliability. Cronbach's alpha is used to evaluate internal consistency, a crucial component for pilot testing [15]. The Cronbach's alpha test results range from 0 to 1, with dependability increasing as the value increases. The formula in equation (1) was used to calculate Cronbach's alpha,  $\alpha$ .

$$\alpha = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\sum s_i^2}{s_t^2} \right) \quad (1)$$

Where,  $k$  indicates the number of questions in survey,  $s_i$  is the standard deviation of  $i^{th}$ , and  $s_t$  is the standard deviation of total score.

The internal consistency of Cronbach's alpha values can be divided into the following categories: <0.5 (unacceptable), >0.5 (poor), >0.6 (questionable), >0.7 (acceptable), >0.8 (good), and >0.9 (excellent) [16]. As per the mentioned general guidelines, a reliability scores of at least 0.7 is consider acceptable.

## 2.6 Descriptive Analysis

Descriptive analysis presents graphical and numerical methods for effectively and easily presenting a collection of data [17]. Before generating overall analysis, research starting with descriptive analysis and utilizing tools like histograms, scatter diagrams, and frequency tables.

## 2.7 Chi-square Test

The Chi-square test, introduced by Karl Pearson in 1900, measures the likelihood of non-random variables in correlation [18]. The variables that used include tablet users and demographic characteristics. The study utilized Chi-square test results to assess significant bivariate connections between two category variables, analysing  $p$ -values and calculating the percentage of each demographic characteristic on tablet usage. The Chi-square test was computed using the formula in equation (2), where,  $O_i$  is observed value and  $E_i$  is expected value. If there is enough data to reject the null hypothesis, it can be concluded that there is no correlation between the two variables.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad (2)$$

## 2.8 Cross-tabulation Analysis

An analysis method used with categorical data is cross tabulation. Bivariate, two-way, and contingency tables are some other names for it. Two variables are displayed in a cross-tabulation table, which one variable is shown as a column and the other as a row [19]. The  $r \times c$  contingency table was used in this study.

A thorough analysis of correlations or dependencies between variables can be achieved by using this method, which counts and arranges data into cells according to the intersection of categories. More insight into the data distribution can be gained from row and column totals, and statistical tests such as Chi-squared can be used to evaluate the importance of detected correlations.

## 2.9 Cramer's V Analysis

Cramer's v analysis is a post-test used to estimate the strength of the link between categorical variables. It typically ranges from 0 to 1, with values near 0 indicating weak correlation and less than 1 indicating strong correlation. The formula given in equation (3) used to determine Cramer's V where,  $\chi^2$  indicates Chi-square test value,  $n$  is sample size and  $k$  is smallest number of row or column. The association strength of Cramer's V values is divided into the following categories: <0.05 (Very weak), >0.05 (Weak), >0.10 (Moderate), >0.15 (Strong), and >0.25 (Very strong) [20].

$$V = \sqrt{\frac{\chi^2}{n(k-1)}} \quad (3)$$

## 2.10 Factor Analysis

Factor analysis is a data reduction technique that breaks down large variables into smaller factors [21], with exploratory factor analysis (EFA) used in this research to determine relationships between factors. The equation (4) illustrates how this model will replicate the maximum correlations.

$$X_j = a_{j1}F_1 + a_{j2}F_2 + \dots + a_{jm}F_m + e_j \quad (4)$$

where,  $m$  is the number of latent factors,  $a_{jm}$  is the factor loading on  $j^{th}$  variable on factor,  $j$  is the number of variables and  $e_j$  is the unique factor.

This study uses Varimax for factor rotation and Principal Component Analysis for factor extraction. Factor rotation involves selecting a model type and quantity, while factor extraction focuses on achieving basic structure and interpretability. There are 16 variables influencing students' tablet usage in this study.

### 2.11 Path Analysis

Path analysis compares direct and indirect links between variables using a component score correlation matrix. Correlation coefficients range from -1 to 1, with a value exceeding 0.05 indicating a connection. Equation (5) represent the coefficient of the variables [22].

$$r = \frac{(b \times \sigma_x)}{\sigma_y} \tag{5}$$

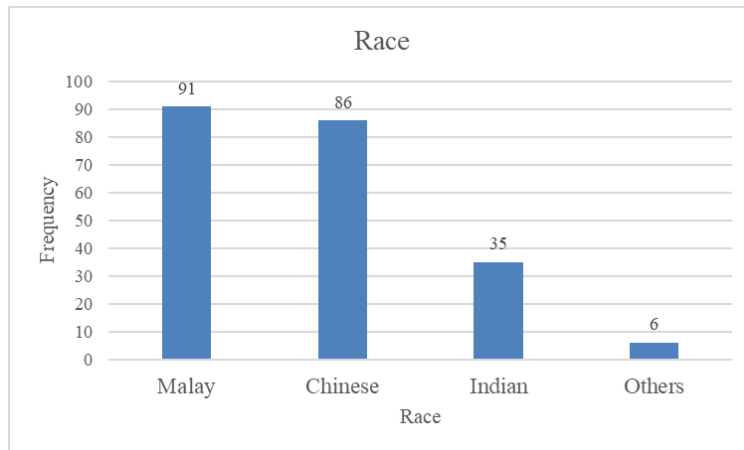
where *b* is the path coefficient,  $\sigma_x$  is the standard deviation of variable x and  $\sigma_y$  = standard deviation of variable y

A path diagram is used in path analysis to show the suggested causal model. Exogenous variables in a path diagram are those elements without clear causes, whereas endogenous variables have incoming arrows. Put another way, the independent factors are called exogenous, while the dependent variables are called endogenous [23].

## 3. Results and Discussion

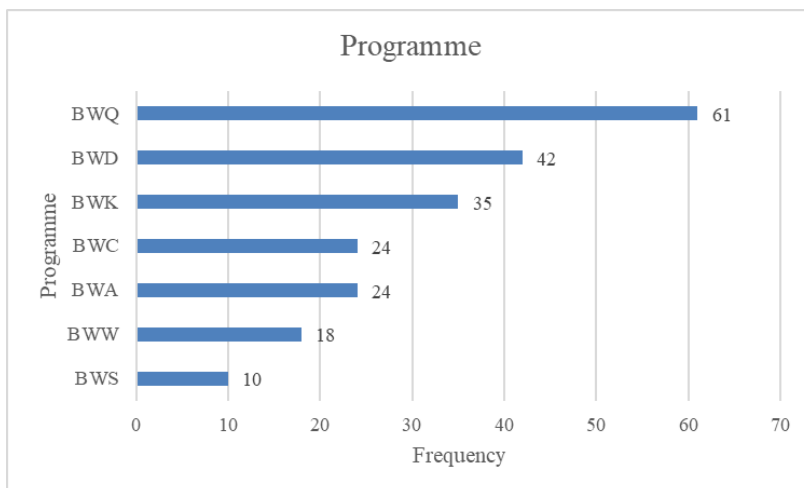
### 3.1 Demographic Profile

218 responds from FAST, UTHM students were collected using the convenience sampling within two months. More than half (60%) of the respondents were female, and the remaining 40% are male. Most of respondents were from matriculation (103), followed by STPM (68), diploma (44), and foundation (3). Furthermore, the highest frequency of responses from year 3 (89), followed by year 4 (54), year 2 (45), and year 1 (30).



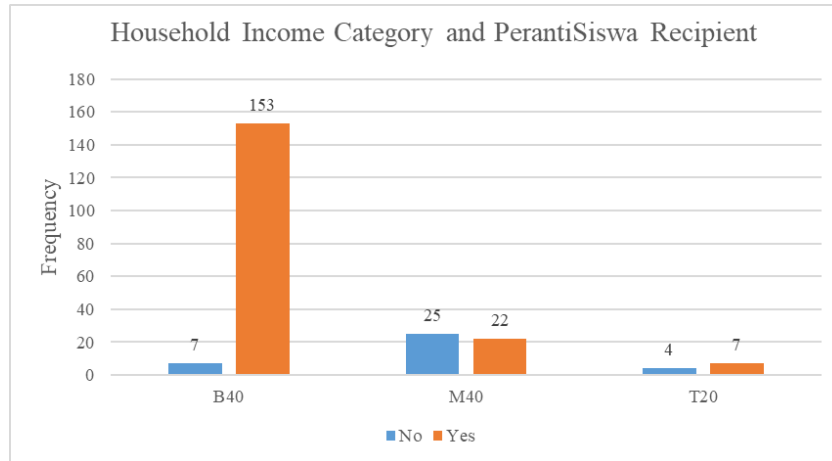
**Fig. 1** Respondents' race

Fig. 1 indicates that most respondents were Malay (91), and Chinese (86), followed by Indian (35), and other races (6), from Kadazan, Iban, and Bidayuh.



**Fig. 2** Respondents' programme study

The result in Fig. 2 shows that BWQ (63) has the highest frequency, followed by BWD (43), BWK (34), BWA (24), BWC (24), BWW (19), and BWS (10).



**Fig. 3** Respondents' household income category and PerantiSiswa recipient

Malaysian household income is categorised into B40, M40, and T20. Fig. 3 shows the household income category with PerantiSiswa recipients. For B40 household, 153 respondents are PerantiSiswa recipients and 7 respondents are not PerantiSiswa recipient. The M40 household consisted of 22 PerantiSiswa recipient and 25 not PerantiSiswa recipients. Among T20 household respondents, 7 respondents are PerantiSiswa recipient and 4 respondents are not PerantiSiswa recipients.

### 3.2 Reliability Test

A reliability test was conducted by using SPSS software to assess the reliability of a questionnaire with 33 Likert-scale items. The Cronbach's alpha value of 0.951 confirmed its internal consistency, indicating its acceptability for further study.

### 3.3 Relationship between Demographic Characteristics and Tablet Usage

The Chi-square test results indicate by the hypothesis below:

$H_0$  : The two variables are dependent.

$H_1$  : The two variables are independent.

A  $\rho$ -value below 0.05 supports to rejecting  $H_0$ , while a larger  $\rho$ -value indicates sufficient proof for independence.

**Table 3** Chi-square test between demographic characteristic and tablet usage variables

Are you using tablet for your study?		
	$\rho$ -value	Decision
Gender	0.038591	<b>Reject <math>H_0</math></b>
Programme	$1.00 \times 10^{-5}$	<b>Reject <math>H_0</math></b>
Household income category	$2.38 \times 10^{-8}$	<b>Reject <math>H_0</math></b>
PerantiSiswa recipient	$6.66 \times 10^{-3}$	<b>Reject <math>H_0</math></b>
How much your time spent on tablet per day?		
	$\rho$ -value	Decision
PerantiSiswa recipient	0.001427	<b>Reject <math>H_0</math></b>
Other than for learning purposes, what do you do with your tablet?		
	$\rho$ -value	Decision
Programme	0.002346	<b>Reject <math>H_0</math></b>
PerantiSiswa recipient	0.000847	<b>Reject <math>H_0</math></b>

Table 3 shows the Chi-square test result between the demographic characteristics and variables of tablet usage. This study found that gender, programme, household income category, and PerantiSiswa recipient were associated with tablet usage. Females used tablet more than males, and BWA respondents used tablets more than other programmes. B40 household respondents used tablets more than M40 and T20 household. PerantiSiswa recipients also used tablets more than non PerantiSiswa recipients. For some students, PerantiSiswa tablet may be their primary or only source of online educational content.

In addition, this survey found a correlation between the time spent on a tablet per day and PerantiSiswa recipients, with a higher proportion using their tablet for 2-3 hours daily.

Lastly, the result shows that only two characteristics, the study programme and PerantiSiswa recipient, correlated with tablet use for other purposes, with BWA program and PerantiSiswa recipients were the higher frequency using tablet just for learning purposes.

### 3.4 Relationship between Tablet Usage and Academic Performance

This study utilised the Chi-square test to establish a relationship between tablet usage and academic performance, with the strength of this association measured using Cramer's V.

**Table 4** Chi-square test between tablet usage variables and academic performance and the strength of association.

Are you using tablet for your study?			
	$\rho$ -value	Decision	Cramer's V
I give full attention in class	0.00812	<b>Reject <math>H_0</math></b>	0.211
CGPA	0.00023	<b>Reject <math>H_0</math></b>	0.313
How much your time spent on tablet per day?			
	$\rho$ -value	Decision	Cramer's V
I give full attention in class	0.02212	<b>Reject <math>H_0</math></b>	0.172
I manage my time efficiently	0.04553	<b>Reject <math>H_0</math></b>	0.148
Other than for learning purposes, what do you do with your tablet?			
	$\rho$ -value	Decision	Cramer's V
I give full attention in class	0.00142	<b>Reject <math>H_0</math></b>	0.206
I attend my class regularly	0.00392	<b>Reject <math>H_0</math></b>	0.203
I manage my time efficiently	0.00114	<b>Reject <math>H_0</math></b>	0.214
CGPA	0.03184	<b>Reject <math>H_0</math></b>	0.178

The Chi-square test and Cramer's V result between the tablet usage variables and academic performance variables is displayed in Table 4. This research found an association between tablet use for study with giving full attention in class and CGPA, where CGPA is correlated stronger than giving full attention in class. Tablets may be a useful learning tools that have a beneficial effect on students' academic achievement, as seen by the stronger association between tablet use and CGPA.

The findings show a significant relationship between daily tablet use with both efficient time management and complete attention in class, with a stronger correlation found with full attention in class than with efficient time management.

According to this study, there is a relationship between tablet purpose with CGPA, attention in the classroom, attendance, and effective time management, having the strongest correlation occurring with efficient time management.

### 3.5 Cross-Tabulation Analysis

Cross-tabulation analysis simplifies data by examining relationships between variables. The variables to be tabulated were selected based on the strongest correlation found in the highest Cramer's V values of three factors, time spent on tablets daily, purpose of tablets, and tablet use for study.

**Table 5** Cross-tabulation between tablet usage and CGPA.

		CGPA		
		Increase	Maintain	Decrease
Tablet usage for study	Yes	<b>107</b> <b>(49.08%)</b>	5 (2.29%)	67 (30.73%)
	No	11 (5.05%)	7 (3.21%)	<b>21</b> <b>(9.63%)</b>

Table 5 reveals a cross-tabulation analysis of tablet usage and CGPA, showing that 49.08% of respondents using tablets for learning increased their CGPA, while 9.63% who were not using tablets for learning reported a decrease.

**Table 6** Cross tabulation between time spent on tablet and attention in class.

		Give full attention in class				
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time spent on tablet per day	Less than 1 hour	0	1 (0.46%)	6 (2.75%)	<b>8</b> <b>(3.67%)</b>	4 (1.83%)
	1-2 hours	0	1 (0.46%)	9 (4.13%)	15 (6.88%)	<b>23</b> <b>(10.55%)</b>
	2-3 hours	0	1 (0.46%)	25 (11.47%)	<b>54</b> <b>(24.77%)</b>	22 (10.09%)
	More than 3 hours	0	0	17 (7.80%)	<b>21</b> <b>(9.63%)</b>	11 (5.04%)

Table 6 shows that respondents who spent less than 1 hour on a tablet found it beneficial for class attention and respondents who spent 1-2 hours on a tablet could concentrate in class. Those who spent 2-3 hours on a tablet found it helpful, while those who spent more than 3 hours found it beneficial.

**Table 7** Cross tabulation between purpose of using tablet and time management.

		Manage time efficiently				
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Tablet purpose	Social media	0	1 (0.46%)	4 (1.83%)	11 (5.05%)	<b>17</b> <b>(7.80%)</b>
	Playing games	0	0	7 (3.21%)	<b>20</b> <b>(9.17%)</b>	5 (2.29%)
	Watching movies	0	3 (1.38%)	28 (12.84%)	<b>36</b> <b>(16.51%)</b>	18 (8.25%)
	Just for learning purpose	0	0	9 (4.12%)	28 (12.84%)	<b>31</b> <b>(14.22%)</b>

Table 7 reveals the connection between tablet usage and time management. Respondents who used tablets for social media agreed they could manage their time, and respondents who played games using tablets were able to manage their time. Respondents who watched movies on tablet agreed they could efficiently manage their time, while respondents were strongly agreed that using tablet just for learning helped them to manage their time.

### 3.6 Factor Analysis

Bartlett's test must have a  $\rho$ -value less than 0.05 and the Kaiser-Meyer-Olkin (KMO) value more than 0.05 in order for the factor analysis test to be considered significant. The KMO value for this dataset is 0.877 and the Bartlett's test result of 0.009, and the test is considered acceptable.

**Table 8** Rotated component matrix

Variables	Component					
	1	2	3	4	5	6
Finish assignment/project faster	<b>0.630</b>					
Organize learning materials	<b>0.617</b>					
Take notes during class	<b>0.586</b>				0.321	
Create PowerPoint presentations	<b>0.577</b>					
Improves some skills	<b>0.563</b>				0.305	
Highlight and add bookmarks easily	<b>0.489</b>			0.325		
Easy to learn	<b>0.483</b>					0.322
Stylus pen increase interest on writing notes	<b>0.451</b>		0.385		0.331	0.371
Easy to get internet connected		<b>0.715</b>				
Save space in bag		<b>0.679</b>				
Save paper and printing cost		<b>0.638</b>				
Durability and battery life is good	0.319	<b>0.544</b>				
Light to carry		<b>0.518</b>				
Friends give positive feedback about using tablets			<b>0.676</b>			
Communicate with friends			<b>0.618</b>			0.334
Parents support in financial resource			<b>0.487</b>			
Got someone to seek help if get problems on tablet			<b>0.459</b>			
Access learning material anytime and anywhere				<b>0.783</b>		
Can catch up on missed classes quicker				<b>0.536</b>		
Help me to achieve better academic performance				<b>0.464</b>		
Can set creative work			0.376	<b>0.442</b>		
Fun to use					<b>0.692</b>	
Motivated when using tablet			0.344		<b>0.537</b>	
Easier to share knowledge with other students						<b>0.738</b>
Use the tablet to communicate with my friends						<b>0.605</b>

Table 8 presents six factors from 25 variables, based on factor analysis. Principal component analysis was used, followed by Varimax and Kaiser normalisation. Factor loadings were displayed in a rotated component matrix. Variables that heavily load on the same factor are typically grouped together in the rotated component matrix, which shows the factor loadings after rotation.

**Table 9** Category of factor

Component	Factor
Component 1	Educational utility (EU)
Component 2	Convenience and portability (CP)
Component 3	Social support (SS)
Component 4	Academic performance and engagement (AP)
Component 5	Motivation and enjoyment (ME)
Component 6	Communication (C)

Table 9 categorises factors into six components: educational utility (EU), convenience and portability (CP), social support (SS), academic performance and engagement (AP), motivation and enjoyment (ME), and communication (C). EU refers to the quality of resources and curriculum fit, CP refers to the ease of using tablet, SS is about how well collaborative learning and other support, AP assesses how tablet affect academic performance, ME determine how much tablet pleasure students, and C refers to the ability of student interaction using tablet.

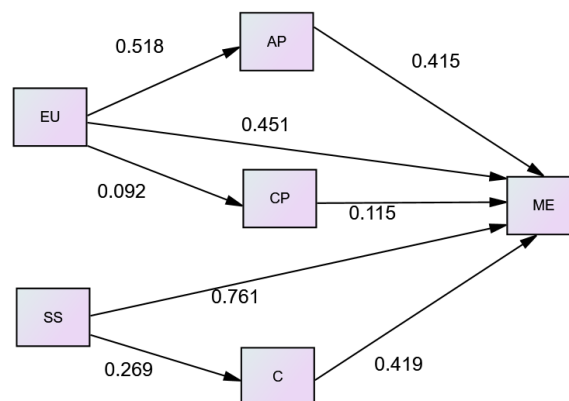
### 3.7 Path Analysis

A component score correlation matrix was created to assess the connections between discovered components, with a value more than 0.05 indicating a relationship between two variables.

**Table 10** Component score correlation matrix

Component	EU	CP	SS	AP	ME	C
EU	1.000	<b>0.092</b>	-0.373	<b>0.518</b>	<b>0.451</b>	-0.279
CP	-0.056	1.000	-0.603	-0.282	<b>0.115</b>	-0.279
SS	-0.393	-0.231	1.000	-0.518	<b>0.761</b>	<b>0.269</b>
AP	-0.413	-0.120	-0.834	1.000	<b>0.451</b>	-0.575
ME	-0.451	-0.115	-0.533	-0.415	1.000	-0.419
C	-0.556	-0.086	-0.467	-0.575	<b>0.419</b>	1.000

The correlation between each component is displayed in Table 10. The EU's impact on CP, AP, and ME is significant, as effective educational resources enhance understanding, improve academic performance, and motivate students, making it more enjoyable to use tablet. CP have an impact ME suggests that students are more likely to be motivated to study when educational resources are readily available and convenient. The result shows a correlation between SS with ME, and C, indicating that peer or mentor support boosts motivation and enjoyment, and open communication among students, enhancing their learning experiences. AP give impact on ME since students frequently feel a sense of success and become more motivated to keep using tablets for education when they perform well academically while using them. C impact ME because a more engaging and joyful learning environment is produced when students are able to communicate with peers and instructors. To sum up, each element had an effect on ME. Students are more likely to be motivated and enjoy their educational experiences when these elements function well together.



**Fig. 4** Path diagram

Figure 4 illustrates the association between variables. EU and SS are the exogenous variables in this study, since no factor affects both of the variables. On the other hand, the endogenous variables are ME, C, AP and CP. Students feel more engaged and have a sense of responsibility over their education when they believe that it is accessible to them, can be adjusted to meet their requirements, and is supported by both their lecturers and classmates.

## 4. Conclusion and Recommendations

### 4.1 Conclusion

This study investigated at how student learning was affected by using tablets. All objectives were achieved through the analysis of the survey responses. Methods such as cross-tabulation analysis, Cramer's V, and the Chi-square test have been used to establish the relationship between tablet usage and academic attainment. Next, factor analysis and path analysis techniques were used to find the association with the tablet use factor.

The first objective of this study is to determine the relationship between tablet usage and demographic characteristics among FAST students using a Chi-square test. Results show that tablet usage is influenced by gender, program, household income group, and PerantiSiswa recipient. Female students tend to use group

education and mobile technology for learning [24]. Tablet usage also varies depending on the academic program, with higher-income households using more affordable devices. PerantiSiswa recipients also impact tablet usage, as it may be their primary method of accessing educational content online.

The second objective is to examine the relationship between tablet usage and students' academic performance using Cross-tabulation analysis and Cramer's V analysis. Results show that tablet usage for learning leads to a stronger correlation with students' CGPA, with most students enhancing their CGPA. Tablets provide access to various educational resources, improving educational experience and potentially improving test performance. Students who spend more than two hours on tablets are more focused and efficient, reducing distractions and enhancing their academic performance [25]. This finding aligns with previous studies indicating that tablet usage is more ambitious [26].

This study examines the factors influencing students' use of tablets for learning using factor analysis and path analysis. The study identifies six components: educational utility, convenience and portability, social support, academic performance, motivation and enjoyment, and communication. The findings suggest that educational utility, convenience and portability, social support, academic performance, and communication all influence motivation and enjoyment. These factors encourage students to actively participate in their education.

## 4.2 Recommendation

Since only FAST, UTHM students included in the current study, it may not accurately reflect the opinions of all UTHM students. Therefore, future research can focus on all faculties at UTHM to understand how tablet usage affects academic performance differently across diverse professions. For various courses, different digital resources and teaching techniques could be required. In addition, a comprehensive survey or evaluation can be carried out by future researchers to learn more about how PerantiSiswa is currently being accepted and used by the receiver. Subsequent study endeavors may examine the direct impact of PerantiSiswa on various learning outcomes, including as test scores, completion rates of assignments, and critical thinking proficiencies.

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## Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

## Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Nursyaza Nabihah Abd Malek, Norhaidah Mohd Asrah; **data collection:** Nursyaza Nabihah Abd Malek; **analysis and interpretation of results:** Nursyaza Nabihah Abd Malek, Norhaidah Mohd Asrah; **draft manuscript preparation:** Nursyaza Nabihah Abd Malek, Norhaidah Mohd Asrah. All authors reviewed the results and approved the final version of the manuscript.

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