

Day 2: Tuesday 24th October 2023 SESSION 2 @ Sepakat 5

13:15	Arrival of participants
13:20	Recital of Surah Al-Fatihah Welcoming remarks by Programme Chair
Keynote Moderator: Prof Somnuk	
13:30	Keynote Session 1 (Prof Ian Mclaughlin)
14:10	Keynote Session 2 (Prof Hamamoto)
14:50	JICA Opening Presentation
15:10	AUN-SEED Introduction
15:30	AFTERNOON BREAK
Session 2 – AIML/CNS Session Chair: Dr S H Shah Newaz	
15:45	Usability Assessment of e-Wallet: User Acceptance Testing Among Students and Merchants - Missie Chundau; Hamimah Ujir; Irwandi Hipiny
16:05	Comparative Study on User Preference of Food Delivery Mobile Application in Malaysia - Johari Abdullah; Magdeline Changai
16:25	Bridging the Digital Gap: A Systematic Review on UI/UX Design Considerations for Elderly-Friendly Digital Wallets - Jonathan Sidi; Syahrul Nizam Junaini; Wang Chai; Nur Alfreeana Alfie; Remmy Gedat; Edwin Mit
16:45	State Management Against Two-Message Attacks in Hash-Based Post Quantum Signatures for Large IoT Sensor Networks Using Blockchain - Vincent Lew Kok Seng; Au Thien Wan; S H Shah Newaz
END OF DAY 2	

Day 2: Tuesday 24th October 2023 SESSION 1 @ Sepakat 4

Session 1 – CC/CNS <i>Session Chair: Dr Ahmad Mohammad</i>	
15:45	Glasses-Free Autostereoscopic Viewing on Laptop Through Spatial Tracking - Muizz Kasim; Somnuk Phon-Amnuaisuk
16:05	Interactive Dance with Visual Background Recomposition Using BLE Beacons - Jiqing Wen; Pai Chet Ng; Ian McLoughlin
16:25	Exploring the Intersections Between the Metaverse and Web3 Emerging Technologies - Pengiran Shaiffadzillah Pengiran Omarali
16:45	uNGINXed: Detecting NGINX Misconfigurations - Kenneth Lee; How Chong Ong; George Neo; Alloysius Goh; Huaqun Guo
END OF DAY 2	

Day 3: Wednesday 25th October 2023 SESSION 4 @ Sepakat 5

8:00	Registration
8:30	JASTIP
8:40	AEJ Presenter
Session 4 – CNS <i>Session Chair: Dr Sharul Haji Tajuddin</i>	
8:50	The Weaponisation of the Internet -- Effect Models - Ian McLoughlin
9:10	The Internet of Things in the Rearing of Giant Freshwater Prawn: A Pilot Study - Musyaffa' Aziz; Wida Haji Suhaili; Ravi Kumar Patchmuthu; Shahriar Shams
9:30	5G-Wi-SUN for Building Management System - Filbert Hoo; Su-Lim Tan; Raymond Ching Bon Chan; Peter Waszecki; Sye Loong Keoh; Chee Kiat Seow; Minghui Li; Qi Cao; Chin-Sean Sum
9:50	Moisture Impact Analysis on NFC Tag Antennas - Najwa Mohd Faudzi; Azlan Aziz; Ahmad Rashidy Razali; Nurul Huda Abd Rahman; Asrulnizam Abd Manaf; Amirudin Ibrahim; Aiza Mahyuni Mozi
10:10	MORNING COFFEE/TEA BREAK

Day 3: Wednesday 25th October 2023 SESSION 6 @ Sepakat 5

Session 6 – AIML <i>Session Chair: Dr Ibrahim Venkat</i>	
10:30	Acoustic-Based Classifier for Detecting Abnormal Events in a University Setting - Jethro P. Batislaong; John Christian R Leonin; Amarah K Utto; Danilo Dadula; Ryan G. Banal; Cristina P. Dadula
10:50	Computer Vision in Smart City Application: A Mapping Review - Aulia Akhrian Syahidi; Kiyoshi Kiyokawa; Fumio Okura
11:10	Classification of Subspecies of Honey Bees Using Computer Vision - Ashan Milinda Bandara Ratnayake; Hartini Haji Mohd Yasin; Abdul Naim; Emeroylariffion Abas
11:30	Adult Content Detection on Indonesian Tweets by Fine-Tuning Transformer-Based Models - Ahmad Fathan Hidayatullah; Rosyzie Apong; Daphne Teck Ching Lai; Atika Qazi
11:50	Educator-Oriented Authoring Tools to Develop Rich Educational Media: A Systematic Review - Azhan Ahmad; Ahmad Elaklouk; Deenina Salleh; Ibrahim Edris
12:10	LUNCH

Day 3: Wednesday 25th October 2023 SESSION 8 @ Sepakat 5

Session 8 – AIML <i>Session Chair: Dr Sharul Haji Tajuddin</i>	
13:30	Personal Identity Information Detection Using Synthetic Dataset - Jie Lin Tan; Venkata Abhishek Nalam
13:50	Enhancing Indoor Smoking Detection Through Deep Learning in AI-Enabled Surveillance Systems - Donny Soh; Indriyati Atmosukarto; Michelle Choo; Arthur Loo; Selvakulasingam Thirunneepan; Toshiki Ishii; Junichi Hirayama; Shuyang Dou; Zhou Mo
14:10	<i>Keynote 3 Moderator 3 (Prof Gyu Myoung Lee)</i> <i>Moderator: Dr Ravi Kumar Patchmuthu</i>
14:30	
15:00	AFTERNOON BREAK

Day 3: Wednesday 25th October 2023 SESSION 10 @ Sepakat 5

Session 10 – AIML <i>Session Chair: Dr Ravi Kumar Patchmuthu</i>	
15:30	Comprehensive Analysis of Feature Extraction Techniques and Runtime Performance Evaluation for Phishing Detection - Subrata Nath; Mohammad Manzurul Islam; Abdullahi Chowdhury; Maheen Islam; Taskeed Jabid; Mohammad Rifat Ahmmad Rashid
15:50	END OF ACIIS 2023

Day 3: Wednesday 25th October 2023 SESSION 3 @ Sepakat 4

8:00	Registration
Session 3 – CC and AIML Session Chair: Dr Nor Zainah Hj Siau	
8:50	Emotions in Video Games: An Investigation of Game Mechanic Influences - Nurwathiqah Ali; Sharul Tajuddin; Arif Bramantoro
9:10	A Framework for Tele-Rehabilitation Gaming System - Ahmad Elaklouk; Ratna Zuarni Ramli; Ibrahim Edris; Nena Padilla-Valdez; Adel Al Jumaily
9:30	An Interactive Alumni Tracking Dashboard - Mubarak Sanusi Dange; NurSuraya Shazlin Sujairi; Syaheerah Lebai Lutfi; Azmien Ielia Mohd Kharunizan; Sharifah Darweena Syed Ahmad Amir Feisal
9:50	Design and Development of an Advanced Upper Limb Rehabilitation Robot for Post-Stroke Rehabilitation - Zunaidi Ibrahim; Khair Hamizan Surzana; Azlan Aziz; Maziri Morsidi; Shamil Rahman; Zeiti Malai Hamid
10:10	MORNING COFFEE/TEA BREAK

Day 3: Wednesday 25th October 2023 SESSION 5 @ Sepakat 4

Session 5 – AIML Session Chair: Dr Arif Bramantoro	
10:30	Evaluating User Interface and User Experience in Mobile Applications Designed for the Elderly - Syazwan Rosman; Hjh Nor Zainah binti Hj Siau; Arif Bramantoro
10:50	Rain <u>Gauge</u> Network Optimization in Brunei-Muara District Using Historical Data - Wallace Chin
11:10	Analysis of Deep Learning Algorithms for Prawn Aquaculture in a Challenging Environment - Tiong Hoo Lim; Wafiq Zariful; Najeebah Az-Zahra Tashim Tashim; Aida M Basri; Hanif Fakhurroja; Suriayati Chuprat; Seno Adi Putra, SSi MT; Pengcheng Liu
11:30	Lane Tracking for Autonomous Road Pavement Inspection with Unmanned Aerial Vehicles - Melody Mae O Maluya; Earl Ryan Aleluya; Joel G Opon; Carl John Salaan
11:50	Enhancing Continual Deep Open-Set Recognition with Perceptive Unknown Feature Search - Gusti Ahmad Fanshuri Alfarisy; Owais Ahmed Malik; Wee-Hong Ong
12:10	LUNCH

Day 3: Wednesday 25th October 2023 SESSION 7 @ Sepakat 4

Session 7 – AIML <i>Session Chair: Dr Au Thein Wan</i>	
13:30	Digital Twinning in Precision Agriculture: Fabrication of a Close-Range Photogrammetry and Microclimate IoT-Enabled Data Acquisition System - Dennis Ivan Chavez Baliguat; Francis Jann A Alagon; Earl Ryan Aleluya; Stephen Haim; Carl John Salaan
13:50	Universiti Sains Malaysia (USM) Talent Management Dashboard - Aisyahatul Mardhiah Mokhtar Alfakari; Syaheerah Lebai Lutfi
15:00	AFTERNOON BREAK

Day 3: Wednesday 25th October 2023 SESSION 9 @ Sepakat 4

Session 9 – AIML <i>Session Chair: Serina Hj Mohd Ali</i>	
15:30	Integrated Prediction System for Optimizing Shrimp Production in Brunei Darussalam - Arif Bramantoro; Hjh Nor Zainah binti Hj Siau; Awangku Muhammad Zul Hafiz
15:50	Intelligent Modeling of Temperature Profile for Sustainable Food Waste Composting - Jia Chi Lai; Yi Lung Then; Siaw San Hwang
17:00	END OF ACIIS 2023

Usability Assessment of E-Wallet: User Acceptance Testing among Students and Merchants

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Abstract— The primary objective of this research is to evaluate the usability of S Pay Global, a digital wallet application used in Sarawak, through user acceptance testing among UNIMAS students and merchants. To accomplish this, a survey was developed to gather user perceptions related to privacy, security, usability, and other relevant factors. The UTAUT2 construct was adapted for this study, focusing on Performance Expectancy, Effort Expectancy, and Habit, in addition to Perceived Security and Perceived Usefulness. The results of the linear regression analysis indicate that constructs such as Performance Expectancy, Effort Expectancy, Habit, and Perceived Usefulness exhibit a significant association with adoption intention. However, Perceived Security demonstrated a weak or non-existent relationship. Descriptive statistics revealed that the *Scan & Pay* feature was a crucial component of an e-wallet, followed by a user-friendly, customizable dashboard with an aesthetically pleasing and minimalist design. Although most respondents expressed concerns regarding the non-standard user interface of S Pay Global, recommendations were made for wireframe designs to enhance the application's usability. These findings provide insights into the development of e-wallet applications and their adoption by users, highlighting the importance of features like *Scan & Pay* and a user-friendly, customizable dashboard.

Keywords—e-wallet, S Pay Global, UTAUT2, User Acceptance Testing

I. INTRODUCTION

The modern digital revolution, driven by the widespread use of the Internet and smartphones, has created significant investment opportunities in payment systems. The emergence of flexible payment services, which attempt to offer businesses and consumers more fantastic options than banks had in the past, has led to the implementation of mobile payment systems on users' mobile devices [1]. An e-wallet is a payment mechanism in which a web-based application or service enables users to manage information related to acquisitions, affiliation, loyalty, and financial data [2]. In Malaysia, various E-wallet platforms have emerged. One of the prominent e-wallets in Sarawak, S Pay Global, is formerly known as SarawakPay, the Sarawak Government Fintech mobile app platform that offers e-wallet functionalities. "Since the launch in 2017, there were 85,445 merchants and 590,290 S Pay Global users recording RM1.8 billion in transactions in 2022" [3]. "Bank Negara Malaysia has permitted six banks "e-money" issuers" and 47 "non-banks" [4]. E-wallet adoption factors are critical for service providers to have a competitive advantage in product marketing.

There are few studies analysing the factors that influence fintech adoption in Sarawak public universities using the UTAUT2 model. [5] assess the effects of "perceived trust", "convenience", and "promotion" on e-wallet adoption using the TAM model in Sarawak. Similarly, [6] investigate "factors influencing the adoption of e-wallet services in Sarawak

utilising the TAM model". Meanwhile, [7] utilise "Fuzzy Importance-Performance Analysis" to define the character of the services in Sarawak Pay.

S Pay Global is one of the recommended e-wallets to be adopted in Universiti Malaysia Sarawak (UNIMAS). However, users frequently consider the application's security features before opting to use it. According to the study's findings by [7], the most significant aspect and criteria of S Pay Global are transactions and security, respectively. Hence it is crucial to assess the usability of S Pay Global by conducting user acceptance testing to determine if the application can support day-to-day operations and to ensure that the system is feasible and reliable for merchants in UNIMAS business needs. The following are the research questions for this project: 1) Research Question 1: How have e-wallet features affected the intention of students and merchants in adopting S Pay Global as one of the payment methods in UNIMAS? 2) Research Question 2: What are the design considerations for e-wallet apps for better usability?

This paper aims (1) to evaluate the usability of S Pay Global applications that affected the intention of adopting it as a medium of payment in UNIMAS and (2) to design the presentation of the S Pay Global feature to enhance its usability. This paper is organized as follows: Section II provides background research on evaluating the effectiveness of social media videos as instructional resources and learning opportunities. The methodology part follows, which includes the design of the research, survey, sampling, and data analysis. The findings and discussion are the next sections, where the results of the processing of the data that were gathered are discussed. The research's results and plans for further work to advance and expand this research will be covered in the last part.

II. BACKGROUND

A study by [8] has proven that mobile wallet is attracting attention as a potential payment method globally due to their extensive use. According to the survey, 88% of respondents intend to use e-wallet apps. Similarly, [9] found that approximately 80% of respondents in Malaysia have attempted to utilise the e-wallet. [10] explores the factors of e-commerce adoption among Sarawakians. They found that Sarawakians prefer functional e-commerce services and the quality of e-commerce products should also be maintained. The current adoption rate of S Pay Global amongst UNIMAS students and merchants is relatively low. Currently, most retailers in UNIMAS have not adopted e-wallets as a mode of payment. However, cashless transactions are now standard, and the global demand for e-wallets is growing exponentially.

Numerous academic literature studies investigate the various facets of e-wallet payment adoption. Relating to this, a study by [11] discover the factors determining e-wallet

acceptance in Malaysia to achieve a cashless society within public institutions employing the UTAUT model. According to the authors, four factors significantly affect the adoption of e-wallets, namely, “facilitating conditions”, “performance expectancy”, “social influence”, and “trust”. On the other hand, [12] determine the factors that affect user acceptance of NFC e-wallets between the Korean and US markets by adapting UTAUT2 with new constructs of “credibility” and “service smartness”, has found that “performance expectancy”, “effort expectancy”, “credibility”, “service smartness”, and “habit” which have a positive association with a user’s behavioural intention of using NFC mobile wallets.

[13] utilised Technology Acceptance Model (TAM) model to evaluate the factors influencing e-wallet adoption among youth in Malaysia, discovered that behavioural intention has a significant impact on e-wallet usage. According to studies, “perceived usefulness”, “perceived ease of use”, and “privacy and security” are said to have a significant impact on behavioural intention to adopt an e-wallet. Similarly, [14] examine the factors influencing university students’ choice to use e-wallets using TAM. [14] also reported that three variables have a significant correlation with the intention to use an e-wallet., namely, “perceived usefulness”, “perceived risk”, and “trust”. A study that utilized the TAM and the Theory of Reasoned Action to examine the factors influencing consumers’ willingness to accept mobile wallets in Malaysia has also found that several factors including perceived usefulness, perceived ease of use, social influence, and brand image significantly impact consumers’ behavioral intention to adopt mobile wallets. Additionally, the study revealed that there is a significant relationship between consumers’ behavioral intention and their willingness to accept mobile wallets [15].

Similarly, [16] conducted a study on the acceptance of e-wallet applications among university students in Malaysia. They examined the relationship between lifestyle compatibility, perceived usefulness, perceived ease of use, trust, and security concerning the intention of using e-wallets as a payment method. The findings indicate that security and trust are not the primary drivers of e-wallet adoption among Malaysian university students. The authors noted that most consumers are still hesitant to use mobile payments due to security concerns. However, the study reveals that lifestyle compatibility, perceived usefulness, and perceived ease of use have a positive impact on the willingness of Malaysian university students to adopt e-wallets.

Concerning e-wallet features, most individuals require e-wallets with enhanced security parameters and are user-friendly. Based on the study by [17], one of the factors that influence the adoption of e-wallets is privacy and security. Lack of privacy and security is among the factors that discourage customers from purchasing products unless it is protected. Similarly [18] noted that e-wallet transactions should be protected by an authorization code and supported by a money-back assurance from the e-wallet system’s provider. Security is a greater influence on intent to purchase using a software or applications [19]. Ease of use is an important feature that determines the adoption of e-wallets. Davis [20] define ease of use as an individual’s perception that utilizing a particular system is simple or requires minimal effort. Therefore, e-wallets that are easy to use are more likely to be adopted by users. This feature includes a user-friendly

interface, a simple registration process, and easy navigation. Meanwhile, [6] noted that users would adopt e-wallets when they consider them valuable. The functionality of an e-wallet is crucial from the standpoint of a business person. According to a report by [21], business owners have the greatest expectations for e-wallet functionality. It is suggested that the e-wallet should be capable of supporting various credit and loyalty cards. According to [7], processing speed, loyalty program, and reward points must also be considered to maintain and ensure the continuity of use from existing users.

Some specific groups of individuals may prefer distinct UI/UX designs. A need analysis on UI/UX design for Malaysian seniors when using a mobile banking app is carried out by [22]. According to [22], the most important feature of a mobile banking application according to senior users is fast loading time followed by secure verification via one-tap approval method.

Overall, the literature on the user acceptance of e-wallets highlights the importance of understanding the key determinants that influence user attitudes towards these digital payment methods. In summary, based on the existing works, before designing or proposing an e-wallet, it is crucial to identify the factors that affect people’s decision to adopt an e-wallet. A careful consideration should be given to the requisite features essential for user acceptance.

III. METHODS

A. Research Design

This study adopts the influencing factors outlined in the UTAUT2 model [23]. Convenience sampling was used to select the participant. The sample subjects were determined according to specific requirements. The respondents must satisfy the following sampling criteria: (1) Must be students or merchants in UNIMAS; (2) Have previously used an E-wallet to complete transactions; and (3) Have experience with the S Pay Global payment method.

B. Data Collection

An online survey has been developed to understand the various factors that influence both students and merchants at UNIMAS in their intention to adopt S Pay Global as a payment method, as well as the design considerations of S Pay Global for better usability. The survey, which consists of 35 closed-ended questions, is carried out in English, and is divided into the following three main sections:

1) *General information*: The first part of the survey is meant to gather basic information about the respondents such as the category of the respondents (merchants/students) and their familiarity with using e-wallets to conduct transactions. This helps us understand how familiar they are with using S Pay Global and why they might or might not want to use it.

2) *Perception of the current S Pay Global*: The second section of the questionnaire comprises 30 questions designed to capture the respondents’ perceptions and experiences of using S Pay Global as a payment method. In this section, participants are asked to provide their ratings of various aspects of the S Pay Global application using a five-point Likert scale that ranges from “Strongly Disagree” to “Strongly Agree”. These ratings are intended to provide insight into the participants’ overall satisfaction with the application and their perceptions of its ease of use, reliability, and security.

3) *Respondents' opinions on S Pay Global*: The final section of the questionnaire, comprised of five questions, is designed to gather respondents' opinions on various aspects of the S Pay Global application. In this section, participants are asked to provide feedback on the current state of the application and identify specific features that they believe should be improved. Furthermore, respondents are asked to rate the importance of various features in an e-wallet application. Finally, this section also inquires about any process flows of the application that could be improved and will solicit feedback on any design or functional elements that could be enhanced. Overall, this section aims to gather valuable insights on how S Pay Global can be improved to meet its users' needs and preferences.

C. Data Analysis

Data obtained from the questionnaires are analysed using the SPSS software. This analytical approach is used to identify and examine the differences between e-wallet users, as well as the relationships between the various variables of interest. The correlation analysis is used to measure the strength and direction of the association between two or more variables, and regression analysis to examine the degree to which e-wallet features affect the intention to adopt S Pay Global.

D. Wireframes

In the context of designing a website or application, wire framing is a crucial process that involves creating a structural layout for the platform. Typically, wireframes are used to organize the content and features of a page based on the user's requirements. At an early stage of development, wireframes are created before the addition of visual design and content, as they help identify the basic structure of a page. In this study, wireframes will illustrate the design and flow of features, considering the survey results obtained.

IV. RESULTS AND ANALYSIS

A. Demographics Characteristics

1) *Respondents' roles*: Based on the results obtained from the survey, a total of 106 participants were identified through convenience sampling. The analysis of the collected data revealed that most respondents were students, accounting for 88 (83%) of the sample size. This finding suggests that students may be the primary users of payment methods, including e-wallets and S Pay Global, within the UNIMAS premises. On the other hand, only 18 (17%) of the respondents identified themselves as merchants or retailers operating within the UNIMAS premises.

TABLE I. ADOPTION RATE OF E-WALLET AMONG STUDENTS AND MERCHANTS IN UNIMAS

Roles	Responses	Total	
		Frequency	Percentage (%)
Students	Yes	87	82.1
	No	1	0.9
Total		88	83%
Merchants/Retailers	Yes	17	16
	No	1	0.9
Total		18	17%
Total		106	100%

2) *Level of adoption of an e-wallet application*: The analysis of the survey data revealed that only 2 (1.9%) of respondents had never used an e-wallet to conduct transactions; both types of respondents were students and

merchants, respectively. In contrast, 104 (98.1%), stated that they had previously used an e-wallet as a payment method. Table I shows 87 (82.1%) of the students in UNIMAS that participated in this survey have previously used an e-wallet as a means of payment. In addition, 17 (16%) of the merchants and retailers operating in UNIMAS claim to have previously utilized e-wallets to perform transactions.

TABLE II. ADOPTION RATE OF S PAY GLOBAL AMONG STUDENTS AND MERCHANTS IN UNIMAS.

Roles	Responses	Total	
		Frequency	Percentage (%)
Students	Yes	82	78.8
	No	5	4.8
Total		87	83.7%
Merchants/Retailers	Yes	17	16.3
	No	0	0
Total		17	16.3%
Total		104	100%

3) *Adoption rate of S Pay Global*: Table II reveals that a vast majority of the respondents, 99 (95.2%), have experience in using S Pay Global as a payment method, which suggests a high level of acceptance of this payment method. However, it is worth noting that a small percentage of respondents, 5 (4.8%), have never used S Pay Global as a payment method, indicating that there is still room for growth in adoption. Further analysis shows that the adoption rate among students is 82 (78.8%), higher than merchants/retailers 17 (16.3%).

TABLE III. RESULT OF CORRELATION ANALYSIS

	D	F	PE	EE	H	PS	PU
D	1	0.686	0.563	0.553	0.203	0.590	0.616
F	0.686	1	0.623	0.712	0.144	0.452	0.668
PE	0.563	0.623	1	0.669	0.597	0.601	0.745
EE	0.553	0.712	0.669	1	0.348	0.623	0.665
H	0.203	0.144	0.597	0.348	1	0.346	0.46
PS	0.590	0.452	0.601	0.623	0.346	1	0.785
PU	0.616	0.668	0.745	0.665	0.460	0.785	1

B. Perception on the current S Pay Global

1) *Correlation analysis*: The correlation coefficients between different variables can be seen in Table III. This table includes the variables Design (D), Functionality (F), Performance Expectancy (PE), Effort Expectancy (EE), Habit (H), Perceived Security (PS), and Perceived Usefulness (PU). The correlation coefficient is a statistical measure ranging from -1 to 1, which indicates the strength and direction of the relationship between two variables. For example, a correlation coefficient of 0 indicates no relationship between two variables. In contrast, a value of +1 or -1 indicates a perfect positive or negative correlation, respectively [22]. Table III demonstrates that D has a strong positive correlation with F ($r = 0.686$), PE ($r = 0.563$), EE ($r = 0.553$), PS ($r = 0.59$), and PU ($r = 0.616$). This result indicates that as D increases, these variables also increase. In addition, F demonstrates a strong positive correlation with EE ($r = 0.712$), a moderate positive correlation with PE ($r = 0.623$), and weak positive correlations with PS ($r = 0.452$), and PU ($r = 0.668$). PE has a moderate positive correlation with EE ($r = 0.669$), a weak positive correlation with PS ($r = 0.601$), and a moderate positive correlation with PU ($r = 0.745$). On the other hand, EE has a weak positive correlation

with PS ($r = 0.348$), and a moderate positive correlation with PU ($r = 0.665$). H has a weak positive correlation with PE ($r = 0.597$), a weak positive correlation with PS ($r = 0.346$), and a weak positive correlation with PU ($r = 0.46$). Finally, PS has a moderate positive correlation with PU ($r = 0.785$).

2) *Regression analysis*: Table IV shows the results of a regression analysis, where the dependent variable is DF (Design and Functionality), and the independent variables are Performance Expectancy (PE), Effort Expectancy (EE), Habit (H), Perceived Security (PS), and Perceived Usefulness (PU). The R-square of 0.620 indicates that the independent variables explained 62% of the variation in the dependent variable. First, the Model section specifies the model number and the dependent variable used in the analysis. Next, the Unstandardized Coefficients section shows the raw regression coefficients for each independent variable. In contrast, the Standardized Coefficients section displays the beta weights for each independent variable. Finally, the t-value section provides the t-statistic for each independent variable. In contrast, the Sig. section shows the p-value. In this table, independent variables have p-values below 0.05, indicating they are statistically significant predictors of DF [25].

TABLE IV. RESULT OF REGRESSION ANALYSIS

Model	Unstandardized Coefficients	Standardized Coefficients	t-value	Sig.	Collinearity Statistics	
					Tolerance	VIF
Constant	1.492		-	-		
PE	0.196	0.315	2.777	0.007	0.317	3.158
EE	0.239	0.308	3.273	0.001	0.463	2.162
H	-0.145	-0.276	-3.447	0.001	0.636	1.571
PS	-0.011	-0.015	-0.139	0.890	0.364	2.744
PU	0.317	0.393	3.142	0.002	0.260	3.841

The Collinearity Statistics section shows each independent variable's tolerance and VIF values. A low tolerance indicates high collinearity [26] means that the independent variables are highly correlated. VIF measures the degree to which the variance of an independent variable is inflated due to collinearity with other independent variables. In this table, all independent variables have tolerances above 0.2 and VIF values below 5, indicating that multicollinearity is not a significant concern. Four independent variables, including PE, EE, and PU, show a significant and positive relationship with the dependent variable DF. However, the results also show that the independent variable H and PS are negatively related to the dependent DF. In the table provided, the variable H has a negative unstandardized coefficient of -0.145 and a negative standardized coefficient of -0.276. This result suggests that for every one-unit decrease in H, the dependent variable will decrease by approximately 0.145 units (unstandardized) or 0.276 standard deviation units (standardized). Therefore, H is negatively associated with the dependent variable, and reduced levels of H may have a detrimental effect on the dependent variable. Similarly, the negative values for the unstandardized coefficient -0.011 and standardized coefficient -0.015 of the variable PS indicate a negative relationship between PS and the dependent variable. This result means that as the value of PS increases by one unit, the dependent variable is expected to decrease by a certain amount, holding all other variables constant. However, the negative relationship is not statistically significant in this

case, as the p-value for PS is above the threshold of 0.05. Based on the result obtained, most of the independent variables (PE, EE, H, PS, and PU) exhibit moderate to strong positive correlations with the dependent variable (DF). This indicates that increases in these independent variables correlate with increases in DF. The regression table also reveals that all independent variables have statistically significant relationships with the dependent variable, except for PS, which has a p-value greater than 0.05. This indicates that there is a high probability (89%) that the observed result occurred by chance alone, assuming that the null hypothesis is true. Therefore, a p-value of 0.890 suggests that the observed result is not statistically significant and may have occurred due to chance, and the null hypothesis cannot be rejected at the chosen level of significance.

C. Preferences and recommendations

1) *Importance feature of e-wallet ranked*: This section outlines student and merchant preferences and recommendations based on their evaluations of 14 e-wallet features. Table V presents the interpretive summary of the test results for respondents' preferences. The variables are ranked based on their means. Results show that the Scan & Pay feature is the most important, followed by Top-up and Customer support, while Loyalty program and Sales history are rated the lowest.

TABLE V. E-WALLET FEATURES RANKING

Variable	Mean	Std. Deviation	Ranking of Features Importance
Scan & Pay (QR Pay)	0.92	0.280	1
Top-up Feature	0.90	0.306	2
Customer support	0.81	0.393	3
Transaction history	0.79	0.407	4
Aesthetic and minimalist design	0.77	0.42	5
Secure verification via one tap approval	0.68	0.469	6
Fingerprint sensors for quick login	0.65	0.479	7
Fast loading time	0.61	0.489	8
Pay Bills	0.52	0.502	9
Fund Transfer	0.50	0.502	10
Audio alert on notification	0.36	0.482	11
Integration with other services (e.g., food delivery)	0.35	0.479	12
Loyalty program (Loyalty rewards)	0.33	0.473	13
Sales history (For merchant)	0.31	0.465	14

1) *Recommendation of the improved features of S Pay Global*: Table VI displays the results of a survey conducted on two distinct user groups, namely students and merchants, in relation to the features of the S Pay Global application. In this study, we had 106 participants, but only 99 were included in the analysis. This is because two people hadn't used any e-wallet, and five others had used different e-wallets, not S Pay Global. Most students (96.3%) and merchants (88.2%) agreed that S Pay Global should have a clear, intuitive, and customizable dashboard. Both groups also liked an aesthetic and minimalist design (93.9% of students and 88.2% of merchants). Additionally, most students (86.5%) thought it's important to have customer support and FAQs in the app, while 88.2% of merchants wanted better loading times for S Pay Global.

TABLE VI. S PAY GLOBAL RECOMMENDATION OF IMPROVED FEATURES

		Role		Total
		Students	Merchants	
Auto logout features	Count	27	14	41
	% within Role	32.9%	82.4%	
Aesthetic and minimalist design	Count	77	15	92
	% within Role	93.9%	88.2%	
Integration with other services (e.g., food delivery)	Count	44	11	55
	% within Role	53.7%	64.7%	
Customer support and FAQ is integrated into the application	Count	71	14	85
	% within Role	86.6%	82.4%	
Clear, intuitive, and customizable dashboard	Count	79	15	94
	% within Role	96.3%	88.2%	
Currency conversion	Count	14	7	21
	% within Role	17.1%	41.2%	
Audio alert on notification	Count	30	13	43
	% within Role	36.6%	76.5%	
Loading time	Count	69	15	84
	% within Role	84.1%	88.2%	
Digital receipt	Count	39	15	54
	% within Role	47.6%	88.2%	
Fingerprint sensors for quick login	Count	24	15	39
	% within Role	29.3%	88.2%	
Total	Count	82	17	99

TABLE VII. S PAY GLOBAL UNNECESSARY AND CONFUSING FEATURES

		Role		Total
		Students	Merchants	
Non-standard UI (image/icon)	Count	67	13	80
	% within Role	82.70%	76.50%	
Promotion (section should be in notification)	Count	29	14	43
	% within Role	35.80%	82.40%	
Confusing Top-Up function ("select top-up method" colour)	Count	53	14	67
	% within Role	65.40%	82.40%	
Difficulty in finding User support/FAQ	Count	38	12	50
	% within Role	46.90%	70.60%	
Overloaded Dashboard/Main menu	Count	73	15	88
	% within Role	90.10%	88.20%	
Total	Count	81	17	98

2) *Unnecessary and confusing features of S Pay Global:* Table VII displays what students and merchants think about unnecessary features in the S Pay Global app. Both groups agreed that the non-standard UI, confusing top-up function, and overloaded dashboard were issues. They also had concerns about the setting icon (students 82.7%, merchants 76.5%) and the color for "select top-up method" (students 65.4%, merchants 82.4%). Most felt there was too much information on the dashboard (students 90.1%, merchants 88.2%). Finding user support or FAQs was a problem for some (students 46.9%, merchants 70.6%). They had different opinions on where the promotion section should be, with students preferring it in the dashboard (35.8%) and merchants

liking it in the notification area (82.4%). One respondent mentioned that some icons, like loyalty rewards and parking, weren't very useful. The app also lacked vouchers, and the parking feature had limited usability.

D. Wireframes

Wireframes are utilized to depict the design and feature flow per the survey results. The survey data indicates that most users prefer a simple and minimalist S Pay Global homepage or dashboard. Fig. 1 showcases the current and suggested designs for a simplified homepage or dashboard.

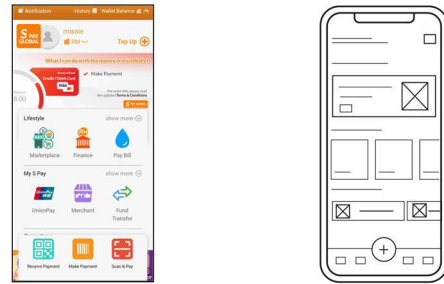


Fig 1. Current and proposed design of homepage



Fig 2. Current and proposed design of top up



Fig 3. Current and proposed design of notification

The new homepage design aims to offer users a streamlined and uncluttered interface, making it simpler to access features like Scan & Pay (QR Pay), Top-up, and customer support. These changes align with participants' preferences for a straightforward and user-friendly interface, addressing concerns about an overloaded dashboard and non-standard UI. Consequently, users will experience a smoother and less overwhelming interaction with the application. Fig 2 illustrates the current and suggested designs for the top-up function, which some users reported as somewhat confusing. Consequently, the proposed designs seek to simplify the process and reduce ambiguity. The proposed design addresses concerns about the clarity of the top-up function by enabling users to select their preferred top-up method and complete transactions without difficulty. The proposed design top-up method simplifies e-wallet topping

by providing a step-by-step approach, addressing customer confusion. Fig. 4 presents both the current and proposed designs of S Pay Global notifications, taking into consideration the positioning of the promotion section. A subset of users has expressed a preference for relocating the promotion section to the notification area instead of the dashboard. This adjustment enhances the accessibility of promotional offers while maintaining a clean and uncluttered main dashboard. The provision of this option aligns with user preferences, fostering a more personalized user experience and mitigating the potential for dashboard clutter.

V. DISCUSSION

This study aims to examine how e-wallet features affect the adoption of S Pay Global as a payment method among students and merchants in UNIMAS. The study used questionnaires to assess the usability of S Pay Global and factors such as perceived security and usefulness were considered. The findings indicate that S Pay Global is highly accepted as a payment method among students and merchants, but there is still room for growth in adoption. The study also identified factors that affect the intention to adopt S Pay Global, with design and functionality having a significant impact. A good design can positively impact the adoption rate of an e-wallet. This study also aims to identify the design considerations for e-wallet apps to enhance their usability, with a focus on improving the presentation of the S Pay Global feature. Participants evaluated 14 different features of an e-wallet app and recommended improvements for S Pay Global. The study found that Scan & Pay, Top-up, and Customer Support were considered the most important features, and that a clear, intuitive, and customizable dashboard and minimalist design were essential. The non-standard user interface of S Pay Global was identified as a concern, indicating a need for better design. Wireframe designs were recommended to better interpret respondents' design intentions for S Pay Global.

VI. CONCLUSION AND FUTURE WORKS

The study offers insights into e-wallet adoption and usability. The regression model explains 62% adoption intention variance, emphasizing significant factors like Performance Expectancy, Effort Expectancy, Habit, and Perceived Usefulness. Limitations include participant selection and sample size. Nonetheless, the findings aid practitioners and developers in improving e-wallets and addressing gaps in the literature, particularly for S Pay Global. To improve predictive power, it is suggested to incorporate additional variables and constructs in future research.

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