

Analyzing User Satisfaction with the CARDS Application Utilizing the End User Computing Satisfaction (EUCS) Method

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Abstract

PT Cahz Teknologi Innovation developed the CARDS application, a digital membership tool. In two Purwokerto elementary schools, primary school students use this program as a digital substitute for physical currency during school transactions. This program has encountered several issues, according to the preliminary study questionnaire. These include frequent errors during usage, errors when topping up the balance, and an inadequate transaction history. To assess the user's perception of an application, we must conduct user satisfaction assessments and pinpoint areas for potential enhancements. An approach that can be employed is End User Computing Satisfaction (EUCS). Assessing user happiness with the EUCS approach in the CARDS application is necessary to understand the elements that impact user satisfaction. The EUCS technique incorporates the following factors: Content, Accuracy, Format, Ease of Use, Timeliness and User Satisfaction. We conducted the study by administering questionnaires to all parents at SD Kristen 1 Purwokerto and SD UMP Purwokerto, using the stratified random sample technique. We received 121 replies in total, 79 from SD UMP Purwokerto and 42 from SD Kristen 1 Purwokerto. The research findings evaluating user satisfaction with the CARDS application at SD Kristen 1 Purwokerto and SD UMP Purwokerto encompass three key aspects: correctness, format, and Ease of use.

Keywords: Application Mobile, CARDS Application, EUCS Method

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I. INTRODUCTION

The current era has been profoundly impacted by the rapid development of information technology, which is intricately linked to the widespread utilization of the internet, which furnishes an abundance of information in ordinary existence [1]. The ongoing technological advancements significantly simplify routine tasks and instigate profound societal transformations [2]. This advancement in technology empowers people with a bounty of knowledge to disseminate information and advertise their own merits [3]. The swift advancement of technology has had a substantial influence on the evolution of payment systems used in commercial transactions. Throughout history, payment systems have experienced substantial advancements and changes [4]. Initially reliant on real currency for transactions, these systems have now transitioned to digital payments, generally referred to as electronic money (e-money). In everyday life, digital payment systems have supplanted currency as the predominant method of exchange [5]. Non-cash payment methods are utilized to optimize business transactions, thereby increasing their efficacy and cost-effectiveness. Non-cash transactions encompass interbank or intrabank transfers, in addition to transfers facilitated by a multitude of electronic money payment programmers. People across all age demographics are increasingly favoring these programmers [5].

The public is increasingly accustomed to utilizing digital payment applications in the current digital age. Numerous individuals utilize applications such as CARDS, which has achieved extensive acclaim, to facilitate their daily financial transactions. Early in 2020, school communities adopted the CARDS application in an effort to simplify transaction processes for students' parents, including bill payments and other school-related matters. There are issues pertaining to the utilization of the CARDS application that require attention. One such concern pertains to the limited comprehension of certain parents when operating the application and inputting their CahzPOIN balance. This is apparent from the challenges they encountered when attempting to replenish the balance using different methods such as Alfamart, QRIS, M-banking, and ATMs. The proliferation of mobile applications in recent times has provided consumers with an alternative means of accessing vital information, unrestricted by location or time. Every mobile application has an interface that acts as a conduit between the user and the application. An approach that can be employed to assess user contentment with mobile applications is the End User Computing Satisfaction model [6].

You can use end-user computing satisfaction as a measure to gauge how happy users are with an application system. This strategy entails evaluating the congruence between user expectations and the actual functionality of the application, ascertaining the extent to which the program meets user expectations. End-user computing happiness can be measured to evaluate the influence of several elements on user satisfaction, such as the quality of the interface, the performance of the applications, and the functionality provided. Doll and Torkzadeh developed a specialized analysis approach that focuses on evaluating end-user satisfaction with technological components [7]. The model consists of five dimensions: content, accuracy, format, usability, and timeliness [8]. The content component of this model research examines the degree to which the application provides relevant and adequate information to consumers. The accuracy dimension pertains to the precision with which the application system delivers data and information to consumers [9]. The format dimension encompasses the visual presentation and organization of the application interface, encompassing factors such as legibility, coherence, and user-friendliness in terms of navigation. The usability dimension evaluates the level of user-friendliness in terms of how effortlessly users can engage with the program and execute the available functionalities. The timeliness dimension focuses on the system's ability to promptly and efficiently deliver information and services to users, meeting their needs and expectations [10].

CahzPOIN is a form of currency that students can use to buy food, drinks, or other items from the cafeteria or school cooperative. A card that functions like an ATM card provides access to CahzPOIN. Students can use the card if their parents or guardians have acquired CahzPOIN, which diverse payment methods like mobile banking, QRIS, ATMs, LinkAja, Alfamart, and Indomaret can obtain. Parents utilize the CARDS program to fulfill many school requirements, including settling student expenses, replenishing the CahzPOIN balance for purchasing things at the cooperative, acquiring food and beverages from the cafeteria, and addressing other school-related issues. The utilization of the CARDS application has been a cooperative effort between the educational institution and PT Cahz Teknologi Inovasi. However, according to the preliminary research questionnaire, 16 participants said that they faced challenges when using the CARDS application to add funds to their CahzPOIN balance using different payment methods. We conducted the study at SD Kristen 1 Purwokerto and SD UMP Purwokerto in partnership with PT Cahz Teknologi Inovasi. We used the CARDS application to streamline communication between the schools and parents regarding student-related issues. A preliminary survey was distributed through popular social media sites like WhatsApp and Instagram, as well as through the creator of the CARDS program, to contact parents who use the service. Based on the initial research questionnaire, we received replies from a total of 16 individuals. Most of the respondents, 62.5%, classified themselves as female, while 37.5% identified themselves as male, as shown in Fig. 1. Most participants were between approximately 17 and 45 years old.

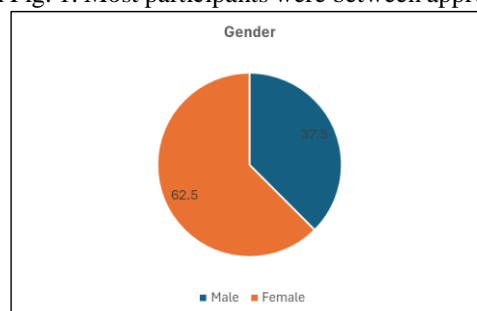


Fig. 1. Respondents' Gender in the Pre-Research

Fig. 2 describes the occurrence of errors. Based on the preliminary questionnaire, 68.8% of participants reported encountering issues while using the CARDS program, while 31.3% did not. Common concerns encountered with the CARDS program encompassed sluggish loading times, delays in updating the CahzPOIN balance following top-ups, and delays in the transaction payment process. In addition, a significant number of parents still lack a comprehensive understanding of how to utilize the CARDS application. We conducted the study by administering questionnaires to all parents at SD Kristen 1 Purwokerto and SD UMP Purwokerto, using the stratified random sample technique.

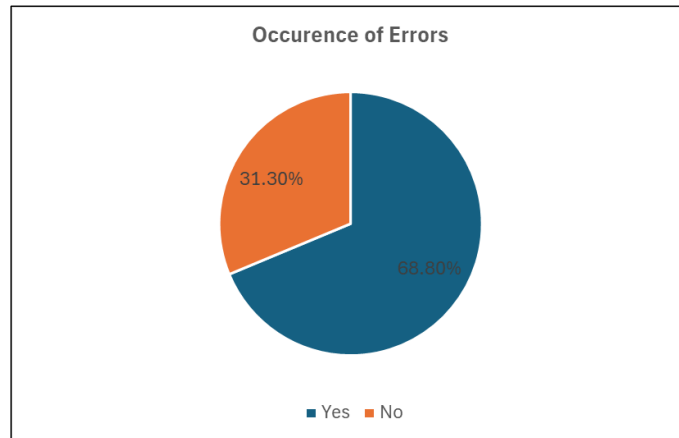


Fig. 2. Occurrence of Errors in the Application

II. RESEARCH METHOD

This study aims to assess the degree of satisfaction among users of the CARDS application. We will utilize the EUCS technique, which takes into account aspects like content, correctness, format, user-friendliness, and timeliness [11] [12]. The study will recruit participants who are users of the CARDS program and will be asked to complete a questionnaire. We specifically designed the questionnaire to assess user satisfaction with the CARDS application in Purwokerto. Parents whose children enroll in SD Kristen 1 Purwokerto and SD UMP Purwokerto specifically make up the target demographic. The study utilized two classifications of tools: hardware and software, as described in the next section. Hardware refers to a wide range of components, including devices, CPUs, memory, HDD, and SSD. The software encompasses a diverse range of programs, including Microsoft Office, web browsers, the website app.diagrams.net, Google Forms, and SPP software. The study is grounded in the questionnaire responses provided by the respondents. The respondents consist of those who use the CARDS application, specifically at SD UMP Purwokerto and SD Kristen 1 Purwokerto. The research methodology involved the development of a questionnaire and its distribution through PT CAZH Teknologi Inovasi Purwokerto, as well as widely used social media channels like WhatsApp and Instagram. The intended recipients were parents or legal guardians of pupils enrolled at SD Kristen 1 Purwokerto and SD UMP Purwokerto. Data collection was conducted using Google Forms, which utilized a Likert scale ranging from 1 to 5. The user population of SD Kristen 1 Purwokerto is 600, whereas at SD UMP Purwokerto, it is 400.

A research investigation examines hypotheses as theoretical solutions to a problem. Research studies that utilize a quantitative methodology frequently involve the formulation of research hypotheses [13]. Hypotheses are generated by the application of multiple linear regression analysis, where this regression is employed to forecast the value of the dependent variable (Y) when the independent variables (X) comprise two or more. The statistical method of multiple linear regression evaluates the impact of two or more independent variables (X1, X2, X3,... Xn) on a dependent variable (Y). The objective of this study is to ascertain whether a functional or causal connection exists between the independent factors and the dependent variable [14]. Fig. 3 shows the hypotheses are developed as follows, taking into account the current problems:

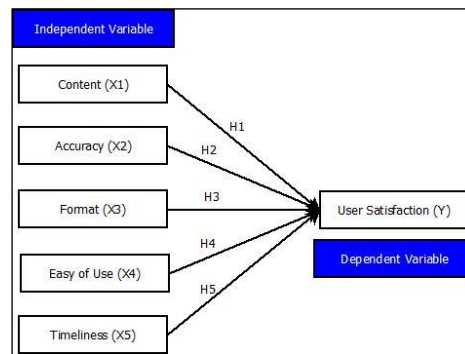


Fig. 3. Hypotheses Research

The following research hypotheses have been generated based on the existing framework and past research:

1. Correlation between content variables and user happiness

Vaya's study demonstrates that the substance of an application has a substantial impact on user satisfaction [15]. In addition, Sari's research shows that the content variable has a significant and advantageous impact on user satisfaction [16]. Here's how we formulate the research hypothesis:

H1 = The independent variable, content, exerts a positive influence on the dependent variable, user satisfaction levels.

2. Correlation between the accuracy variable and user pleasure

Vaya's research demonstrates a clear and direct relationship between the correctness of an application's information and the levels of user happiness. Greater information accuracy has an increased impact on user satisfaction [15]. The research findings reveal that the accuracy variable significantly and positively influences satisfaction [16]. The description formulates the research hypothesis as follows:

H2 = The description presents the research hypothesis in the following manner.

3. The relationship between the format variable and user happiness

Sari's research demonstrates that the format variable has a substantial and beneficial impact on customer satisfaction [16]. Based on the previously provided explanation, we formulate the study hypothesis as follows:

H3 = The changing format positively impacts user satisfaction levels.

4. The relationship between the variables of Ease of use and user pleasure

According to Sari's research, the variable of Ease of use has a positive and considerable impact on user satisfaction [16]. There is a direct correlation between a system's Ease of operation and the amount of user happiness. The description above formulates the study hypothesis in the following manner:

H4 = The variable usability has a positive impact on user satisfaction levels.

5. The relationship between the timing variable and user happiness

Sari's research demonstrates that the timeliness element has a substantial and favorable impact on user satisfaction [16]. Enhanced user perception regarding the swiftness and precision of the system input process results in heightened user contentment. According to the information provided above, the research hypothesis is formulated as follows:

H5 = The variable timeliness has a positive impact on user satisfaction levels.

III. RESULTS AND DISCUSSION

A. Data Collection for Research

Based on the data from CARDS application users at SD Kristen 1 and SD UMP Purwokerto, the population consists of 1,000 individuals who are users of the CARDS application. The research sample was calculated using Slovin's Equation (1).

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

$$n = \frac{1000}{1 + 1.000(0.10)^2}$$

$$n = \frac{1000}{1 + 1.000(0.01)}$$
$$n = \frac{1000}{1 + 10}$$
$$n = \frac{1000}{11}$$
$$n = 90.91$$

Information:

- n = Number of samples
- e = Error tolerance limit (Margin Of error = 10%)
- N = Number of population

Slovin's formula determined a sample size of 91 respondents from a total population of 1,000, with a margin of error of 10%. The data collection process involved the use of Google Forms, which were distributed using WhatsApp and Instagram. Additionally, PT Cahz Teknologi Inovasi assisted in spreading surveys to groups of parents at each school. SD Kristen 1 Purwokerto received the questionnaires and distributed them to parents. In addition, personal conversations or the distribution of questionnaire links were used to share the questionnaire with other parents for completion. The questionnaire obtained 124 respondents, satisfying the minimum needed sample size. However, the analysis excluded a portion of the questionnaire responses because three respondents provided duplicate answers. This study used a total of 121 respondents for analysis.

Based on the questionnaire results, here are the characteristics of the respondents obtained

1. The gender of the respondents

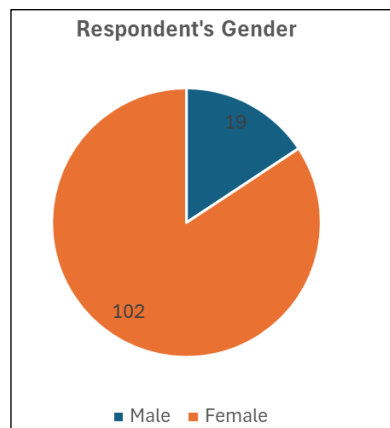


Fig. 4. Respondent Demographics Based on Gender

Fig. 4 describes the demographic data based on respondents' gender, categorized 19 respondents as male and 102 respondents as female.

2. Age

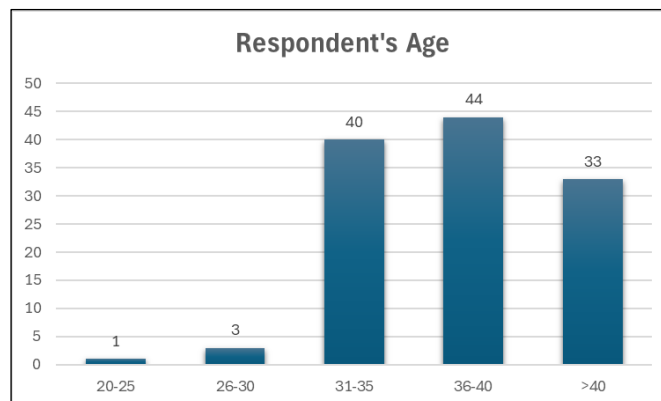


Fig. 5. Demographics Based on Respondents' Age

The demographic data, which was categorized based on respondents' age, classified the respondents into the following groups: There was 1 respondent between the ages of 20 and 25, 3 respondents between the ages of 26 and 30, 40 respondents between the ages of 31 and 35, 44 respondents between the ages of 36 and 40, and 33 respondents beyond the age of 40, as shown in Fig. 5.

3. Occupation

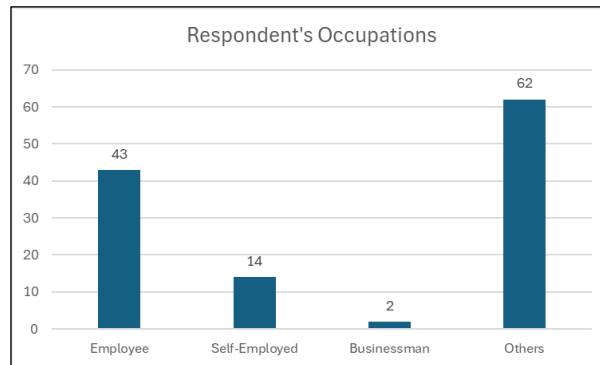


Fig. 6. Demographics of Respondents' Occupations

Fig. 6 shows the demographic data based on respondents' occupations, categorized respondents as 43 employees, 14 entrepreneurs, 2 business owners, and 62 others, as can be seen in Fig. 6.

4. School of the students' parents

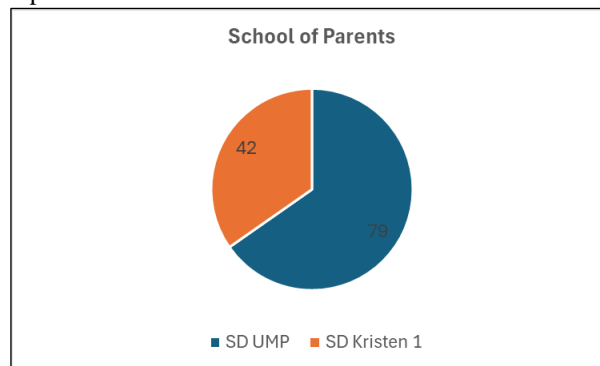


Fig. 7. Demographics of Parents of Students in Each School

The demographic data based on the school of the student's parents categorized 79 respondents as parents from SD UMP and 42 respondents as parents from SD Kristen 1, which can be seen in Fig. 7.

5. Status as the student's guardian

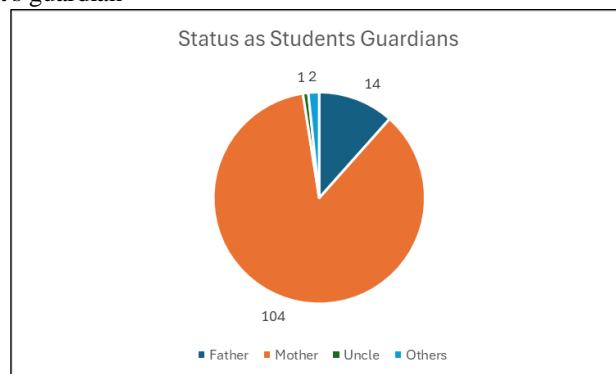


Fig. 8. Demographics of Status as Student Guardians

The demographic data based on the status of the student's guardian categorized 104 respondents as mothers, 14 respondents as fathers, 1 respondent as uncles, and 2 respondents as others, which can be seen in Fig. 8.

6. Duration of app usage

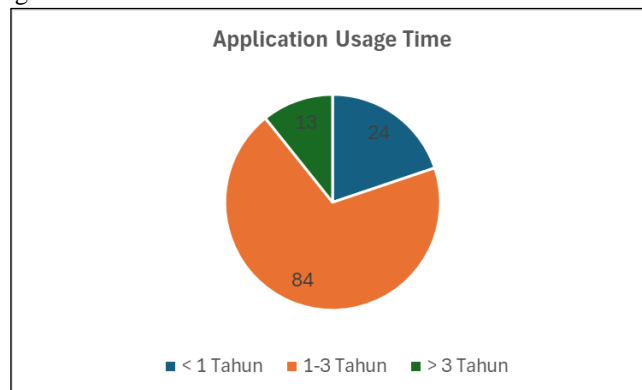


Fig. 9. Demographics of Application Usage Time

The demographic data based on the duration of CARDS application usage categorized 24 respondents as using the application for less than a year, 84 respondents for 1-3 years, and 13 respondents for more than 3 years, as can be seen in Fig. 9.

B. Validity testing

Validity testing was performed using SPSS version 26 software to determine the calculation. r_{Value} From 121 respondents obtained from the questionnaire distribution. The results of the validity testing can be seen in Table I under the r_{Count} Column for validity testing.

TABLE I. VALIDITY TESTING RESULT

No	Variable	Research Instrument Code	r_{Value}	r_{Count}	Result
1	Content (X_1)	$X_{1,1}$	0.897	0.150	Valid
		$X_{1,2}$	0.757	0.150	Valid
		$X_{1,3}$	0.764	0.150	Valid
		$X_{1,4}$	0.693	0.150	Valid
2	Accuracy (X_2)	$X_{2,1}$	0.746	0.150	Valid
		$X_{2,2}$	0.587	0.150	Valid
3	Forma (X_3)	$X_{3,1}$	0.732	0.150	Valid
		$X_{3,2}$	0.765	0.150	Valid
4	Ease of Use (X_4)	$X_{4,1}$	0.760	0.150	Valid
		$X_{4,2}$	0.833	0.150	Valid
5	Timeliness (X_5)	$X_{5,1}$	0.759	0.150	Valid
		$X_{5,2}$	0.641	0.150	Valid
6	User Satisfaction (Y_1)	Y_1	0.895	0.150	Valid

The validity test for the 121 respondents with a 14-item questionnaire was conducted using SPSS version 26 software, indicating that the research instrument is valid with a significant value of one-way test at 0.05 on the critical correlation coefficient (r) table, using the formula $Df = N - 2$, where N is the Number of respondents ($121 - 2 = 119$), resulting in a critical r value of 0.1502, rounded to 0.150. Validity is a measurement conducted to ascertain how well the instrument used measures user satisfaction.

1. The Reliability

The reliability test was performed utilizing the SPSS version 26 program, employing Cronbach's alpha. The obtained Cronbach's alpha value was 0.963, above the threshold of 0.6. Reliability testing is deemed reliable if Cronbach's alpha result is greater than 0.6. Therefore, we can conclude that the 14-item research instrument is reliable. We have confirmed the validity and reliability tests of the entire study instrument, paving the way for the next round of calculations. The data collection findings of the CARDS application user happiness questionnaire, utilizing the end-user User Computing happiness technique, yielded a total of 121 samples.

2. The questionnaire distribution results

A total of 121 samples were collected for user satisfaction data of the CARDS application utilizing the End User Computing Satisfaction technique. The data collected from the user satisfaction questionnaire of the CARDS application, utilizing the End User Computing Satisfaction approach, included 13 research instruments. We assessed the participants' responses to each question using a Likert scale. The results obtained were as follows: The distribution of responses among the 121 respondents is as follows: strongly agree (SS): 448; agree (S): 701; neutral (N): 330; disagree (TS): 65; and strongly disagree (STS): 29. These responses yielded a total score of 1573.

3. Calculation of End User Computing Satisfaction (EUCS)

The validated and reliable questionnaire responses are subsequently analyzed using the End User Computing Satisfaction (EUCS) approach on five variables: content, accuracy, format, Ease of use, and timeliness. This analysis aims to identify the level of user satisfaction for each variable.

a. Content variable (X_1)

The content variable has 4 statement items filled out by 121 respondents, and their answers are calculated using the EUCS formula to determine the level of satisfaction with the content variable. Before calculating using the EUCS formula, the total Score of the answers is calculated based on the Likert scale. Based on the calculations conducted, the content variable obtained a percentage result of 80.74%, which falls into the SATISFIED category. This means that the content variable in the CARDS application has fulfilled user needs in providing information.

b. Accuracy variable (X_2)

According to the calculations, the accuracy variable achieved a percentage value of 76.28%, classifying it as being in the SATISFIED group. The accuracy variable in the CARDS program is inherently exact, resulting in infrequent errors throughout its usage.

c. Format variable (X_3)

Based on the calculations conducted, the format variable obtained a percentage result of 78.84%, which falls into the SATISFIED category. This means that the format variable in the CARDS application has met user needs in terms of layout, design, and color.

d. Ease of use variable (X_4)

According to the calculations, the 'ease of use' variable achieved a percentage score of 79.83%, placing it in the SATISFIED category. This indicates that the 'Ease of use' factor in the CARDS program is very user-friendly and convenient for users to incorporate into their daily tasks.

e. Timeliness variable (X_5)

The timeliness variable obtained a percentage result of 76.86%, which falls into the SATISFIED category. This means that the timeliness variable in the CARDS application provides timely information to users.

C. Hypothesis Testing

1. T-test

We perform the T-test at a significance level of 5%. We can conclude that the independent factors have a significant influence on the dependent variable separately if the significance level is less than 0.05 and the estimated t-value exceeds the t-table value. The t-table value can be determined by utilizing the subsequent Equation (2):

$$T - table = \left(\frac{\alpha}{2}; n - K - 1 \right). \quad (2)$$

Where:

α = Significance level 0.05

n = Number of respondents

K = Number of independent variables

In this study, the t-table value is obtained as follows.

$$\begin{aligned} T \text{ tabel} &= T \left(\frac{\alpha}{2}; n - k - 1 \right) \\ &= T \left(\frac{0.05}{2}; 121 - 5 - 1 \right) \\ &= T (0.025; 115) \end{aligned}$$

In the T-test, looking at the alpha value of 0.025 and n value of 115, the result is 1.980.

2. *F-test*

The F-test is performed at a significance level of 5%, or 0.05. Suppose the significance level is less than 0.05 and the estimated F-value is greater than the F-table value. In that case, it can be concluded that the independent variables have a collective influence on the dependent variable. The F-table value can be determined by utilizing the subsequent Equation (3):

$$F - table = F(K; n - K) \quad (3)$$

Where:

K = Number of independent variables

N = Number of respondents

The F-table value in this study was obtained as follows:

$$\begin{aligned} F \text{ tabel} &= F(K; n - K) \\ &= F(5; 121 - 5) \\ &= F(5; 116) \end{aligned}$$

Using the F-table with a significance level of 0.05 and a sample size of 116, we obtained a result of 2.29. The F-test resulted in a significance value of $0.000 < 0.05$, showing a substantial impact of the independent factors (content, correctness, format, convenience of use, and timeliness) on the dependent variable (user satisfaction). The obtained F-value of 70.133, which is greater than the critical value of 2.29, provides strong evidence in favor of this conclusion.

3. *Results of User Satisfaction Analysis*

The results of the analysis of user satisfaction for the CARDS application using the End User Computing Satisfaction method are as follows:

1. **User satisfaction for the content variable:**

Based on the answers from 121 respondents with a total of 4 question items, the content variable obtained a percentage of 80.74%, falling into the SATISFIED category. The respondents' answers for each research instrument, from largest to smallest, were $X_{1.2} = 495$, $X_{1.1} = 492$, $X_{1.4} = 490$, and $X_{1.3} = 477$, with a total score of 1954.

2. **User satisfaction for the accuracy variable:**

Based on the answers from 121 respondents with a total of 2 question items, the accuracy variable obtained a percentage of 76.28%, falling into the SATISFIED category. The respondents' answers for each research instrument, from largest to smallest, were $X_{2.1} = 490$ and $X_{2.2} = 433$, with a total score of 923.

3. **User satisfaction for the format variable:**

Based on the answers from 121 respondents with a total of 2 question items, the format variable obtained a percentage of 78.84%, falling into the SATISFIED category. The respondents' answers for each research instrument, from largest to smallest, were $X_{3.2} = 487$ and $X_{3.1} = 467$, with a total score of 954.

4. **User satisfaction for the Ease of use variable:**

Based on the answers from 121 respondents with a total of 2 question items, the Ease of use variable obtained a percentage of 79.83%, falling into the SATISFIED category. The respondents' answers for each research instrument, from largest to smallest, were $X_{4.1} = 483$ and $X_{4.2}$, with a total score of 966.

5. **User satisfaction for the timeliness variable:**

Based on the answers from 121 respondents with a total of 2 question items, the timeliness variable obtained a percentage of 76.86%, falling into the SATISFIED category. The respondents' answers for each research instrument, from largest to smallest, were $X_{5.1} = 486$ and $X_{5.2} = 444$, with a total score of 930.

4. *Results of Hypothesis Testing*

Table II presents a comparison between the outcomes of computing the Significance Value and the Score of t_{value} . The hypothesis testing conclusion will be rejected if the Significance Value is greater than the Score of the t_{value} . The EUCS method's research findings confirm the hypotheses H2, H3, and H4.

TABLE II. RESULTS OF HYPOTHESIS TESTING

Hypothesis	Significance Value	Score of t_{value}	Result
H1: <i>Content</i> → <i>User Satisfaction</i>	0.750	0.320	Rejected
H2: <i>Accuracy</i> → <i>User Satisfaction</i>	0.013	2.533	Accepted
H3: <i>Format</i> → <i>User Satisfaction</i>	0.002	3.195	Accepted
H4: <i>Easy of Use</i> → <i>User Satisfaction</i>	0.007	2.729	Accepted
H5: <i>Timeliness</i> → <i>User Satisfaction</i>	0.213	1.252	Rejected

5. *Recommendations for System Improvement:*

a. Content Variable

The results of hypothesis testing H1 indicate a positive impact on user satisfaction. This suggests that the content or information offered by the CARDS application fulfils the requirements of the users. Suggestions for enhancing the quality of the CARDS application in terms of content involve offering comprehensive transaction details, such as transaction history, to enable users to check it consistently.

b. Accuracy Variable

According to the findings of hypothesis testing H2, it is determined that there is a favourable influence on user satisfaction. This implies that the CARDS application has a high level of precision or accuracy. Suggestions for boosting the correctness of the CARDS program include optimizing its efficiency to mitigate errors and expedite the loading process, which is presently sluggish.

c. Format Variable

The results of hypothesis testing H3 indicate that it negatively impacts user satisfaction. Hence, it is necessary to provide suggestions for enhancing user happiness by upgrading the CARDS application. Suggestions for the format variable involve improving functionalities, such as permitting the use of CahPOIN balance as a payment mechanism across different commerce platforms and facilitating the transfer of CahPOIN balance to multiple bank accounts for cash withdrawals.

d. Ease of Use Variable

Based on the results of hypothesis testing H4, it is found to have a negative impact on user satisfaction. Therefore, recommendations for improving the CARDS application to enhance user satisfaction are necessary. Recommendations for the Ease of use variable include maximizing performance when accessing the CARDS application in areas with poor signal or difficult connectivity.

e. Timeliness Variable

Based on the results of hypothesis testing H5, it is found to have a positive impact on user satisfaction. This indicates that the timeliness or promptness provided by the CARDS application is satisfactory. Recommendations for improving the CARDS application in terms of timeliness include enhancing the application's performance to provide users with information quickly and accurately, as well as providing up-to-date information.

IV. CONCLUSION

The study's analysis and discussion led to the following conclusions: the CARDS application for user happiness using the End User Computing Satisfaction formula, which considers variables such as content, correctness, format, convenience of use, and timeliness. The evaluation showed that users were satisfied with the application. The accuracy variable yielded the smallest proportion, specifically 76.28%. The results of this study's hypothesis testing show support for hypotheses H2, H3, and H4 but not for hypotheses H1 and H5. Moreover, it's clear that the accuracy level, layout, and user-friendliness of the CARDS application at SD Kristen 1 Purwokerto and SD UMP Purwokerto significantly influence user satisfaction. We have shared the research findings with PT Cahz Teknologi Innovation to improve the CARDS application.

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