JOURNAL MEDICAL INFORMATICS TECHNOLOGY
medinftech.org ISSN 2988-7003 (online)

Analyzing User Experience and User Satisfaction: Evaluating User Acceptance of the Halo Hermina App

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ARTICLE HISTORY

Received: 11 July 24
Final Revision: 06 August 24
Accepted: 29 August 24
Online Publication: 30 September 24

KEYWORDS

Correlation Analysis, Halo Hermina Mobile Health Application, User Acceptance, User Experience, User Satisfaction.

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DOI

10.37034/medinftech.v2i3.45

A B S T R A C T

This research investigates the factors influencing user acceptance of the Halo Hermina mobile health application through an analysis of user experience and satisfaction. The study utilized a survey method to gather feedback from Halo Hermina users, assessing the questionnaire's validity and reliability. The results indicate strong validity across most items, with correlation values between 0.779 and 0.828 for performance expectancy and over 0.77 for effort expectancy. The reliability analysis shows high internal consistency, with Cronbach's Alpha values exceeding 0.976. User satisfaction scored the highest mean (4.027), indicating a consistent high level of satisfaction among users. The correlation analysis reveals significant relationships between performance expectancy, effort expectancy, facilitating condition, and behavioral intention, with the strongest correlation found between performance expectancy and effort expectancy (0.8796). Overall, the study emphasizes the crucial role of enhancing user experience and satisfaction to boost the adoption of mobile health applications like Halo Hermina, providing valuable insights for developers and stakeholders to enhance application features and service quality to meet user expectations effectively.

1. Introduction

The rise of mobile health (mHealth) applications has transformed the landscape of healthcare delivery, offering accessible, convenient, and cost-effective solutions. However, user acceptance remains a pivotal factor in determining the success and sustainability of these applications. Understanding the factors influencing user acceptance is crucial for optimizing the design and implementation of mHealth apps to align with user expectations and requirements.

Numerous studies have identified key determinants influencing the acceptance and usage of mHealth applications, including performance expectancy, effort expectancy, social influence, and facilitating conditions [1]. Additionally, individual characteristics such as age, gender, and prior smartphone experience play a role in moderating these relationships [2]. Models like the Technology Acceptance Model (TAM) have been widely used to analyze the acceptance of health technologies, emphasizing perceived usefulness and ease of use as primary drivers of user adoption intentions [3]. Factors like self-efficacy and response-efficacy have also been shown to impact technology acceptance significantly [4].

Trust, perceived value, and privacy concerns have emerged as critical factors in shaping user acceptance of mHealth applications [5], underscoring the complex dynamics of technology adoption in healthcare settings [6]. Recent research has demonstrated the influential role of user experience and service quality in driving user acceptance among healthcare practitioners, emphasizing the importance of these aspects in promoting acceptance of health applications [7].

Health Information Systems (HIS) have been recognized for their transformative potential in empowering patients with knowledge, enhancing engagement in health decisions, and streamlining healthcare processes. However, concerns regarding the validity, security, and user comfort with HIS, as well as the quality control of health information, are pressing issues that need to be addressed to ensure reliable and accurate health data for users [8], [9], [10], [11], [12].

The Halo Hermina app's deep integration with the Hermina hospital network offers a unique context for

evaluating how specialized integration impacts user satisfaction and acceptance. This focus contrasts with apps like Halodoc or Alodokter, which offer broader but less integrated service ranges. Studying user acceptance of Halo Hermina can reveal insights into how users experience a health app that is tightly coupled with a single network of hospitals, potentially enhancing service continuity and personal medical management compared to more generalized apps. The research explores how users perceive and interact with services that are customized for a specific healthcare network. This is particularly relevant for understanding the potential benefits and drawbacks of network-specific applications compared to more generalized health service platform. This study aims to fill gaps in existing research by focusing on how integration with a specific hospital network affects user satisfaction, a topic less explored in studies of broader health apps. It provides valuable insights into the advantages and challenges of specialized versus generalist health apps [13], [14].

This study aims to address several significant gaps in the existing research on mobile health applications, particularly focusing on those deeply integrated with specific hospital networks, like the Halo Hermina application. Previous research, has explored general aspects of usability and functionality in mobile health apps but has largely overlooked the impact of such apps when integrated with a single healthcare network [15], [16]. This study fills this gap by examining how the specialized integration with the Hermina hospital network influences user satisfaction and continuity of care, areas that remain under-researched. Additionally, while much of the existing literature addresses user experience in general health apps, there is a lack of focus on the personalized user experiences provided by network-specific applications. This research investigates how tailored services and integrated medical records within a specific hospital network affect user. The primary purpose of this study is to evaluate user acceptance and satisfaction with the Halo Hermina application, specifically focusing on how its integration with the Hermina hospital network influences the overall user experience. This study aims to assess how various aspects of the app, such as usability, functionality, and personalization, impact user satisfaction within the context of a specialized healthcare network. Additionally, it seeks to investigate the effects of the app's deep integration with a single hospital network on continuity of care and service quality, in comparison to more generalized health applications. By identifying significant predictors of user acceptance and satisfaction, including demographic factors and specific app features, the study intends to provide a comprehensive understanding of the advantages and limitations of specialized network integration. Furthermore, the study aims to offer a comparative analysis between the Halo Hermina application and other generalized health platforms, thereby contributing valuable insights into the effectiveness of network-specific health applications and informing future mobile health app design and implementation.

2. Research Method

2.1. Research Design

His study utilizes a quantitative research design to explore the factors influencing user acceptance of the Halo Hermina mobile health application. The key variables under examination include user experience, user satisfaction, and user acceptance. Data collection was conducted through a structured questionnaire administered to Halo Hermina users [17].

2.2. Population and Sample

The survey was administered using Google Forms, the target population for this study comprises users of the Halo Hermina mobile health application. A random sample of 109 respondents was selected from the user base of Halo Hermina to participate in the study [18]. .These tools offer features such as automated data collection, data management, and analytics

2.3. Data Collection Instrument

A structured questionnaire was crafted based on established scales found in prior research. The questionnaire encompassed five sections:

Demographics: Collecting data on age, gender, age education level, and Occupation.

Performance Expectancy (PE): performance expectancy reflects the user's expectations of how much the technology or application will provide benefits or desired outcomes for them in terms of performance or achieving specific goals [19].

Effort Expectancy (EE): effort expectancy influences the user's willingness to adopt and use a technology based on their perceived level of effort required to interact with it [20].

Facilitating Condition (FC): Facilitating conditions play a crucial role in supporting users in overcoming any potential barriers or challenges they may face when trying to use the technology [21].

Behavioral Intention (BI): behavioral intention helps in understanding users' decision-making processes and predicting their future actions regarding technology adoption and usage [22].

Table 1. Survey Questions for Halo Hermina Application Evaluation

Category	Item	Question
PE	Q01	The Halo Hermina application is very useful as an online patient registration system?
	Q02	I feel satisfied using the Halo Hermina Application?
	Q03	In my opinion, registering via the I Halo Hermina Application saves more time than queuing manually?

Category	Item	Question
	Q04	Online patient registration using the Halo Hermina Application is very effective?
EE	Q05	Using the Halo Hermina Application makes it easier for me to plan visits to the polyclinic doctor?
	Q06	The Halo Hermina Application operating system is easy to understand?
	Q07	Application The Halo Hermina application is easy for me to learn?
	Q08	Registration services using the Halo Hermina Application are faster than manual registration services?
FC	Q09	The physical appearance of the Halo Hermina application machine in the hospital is good and attractive?
	Q10	The internet connection on the Halo Hermina Application machine is fast and smooth?
	Q11	The menu display on the Halo Hermina application machine is clear and easy to understand?
	Q12	Printing queue numbers via the Halo Hermina Application machine quickly and smoothly?
BI	Q13	I use the Halo Hermina application because I see other people using it?
	Q14	I use the Halo Hermina App because other people and hospital staff told me?
	Q15	I'm sure other people or hospital staff will help me if I have difficulty using the Halo Hermina Application?

2.4. Data Collection Procedure

The data collection process involved administering an online survey distributed through email and various social media platforms, especially on whatsapp groups. The survey remained open for responses for a duration of 2 weeks. Participation in the survey was voluntary, and all respondents provided informed consent before proceeding to answer the questionnaire [23]. By implementing these strategies, the data collection process aimed to ensure that the survey reached a wide and relevant audience, collected high-quality data, and maintained ethical standards of research. The use of multiple distribution channels and the emphasis on user consent and data privacy were crucial in obtaining reliable and actionable insights into user acceptance of the Halo Hermina application.

2.5. Data Analysis

The analysis process is crucial for deriving meaningful insights from survey data. It involves several steps, including data preparation, statistical analysis, and interpretation. Data analysis was carried out using Python programming language alongside libraries such as pandas, matplotlib, and statmodels. Here's a detailed breakdown of the analysis process and how statistical techniques were applied to answer the research questions:

The first step is to prepare the data and check missing value next Convert the satisfaction columns to numerical values for analysis Descriptive Statistics, Validity and Reliability Tests, Correlation Analysis, Regression Analysis.

Descriptive Statistics: Utilized to summarize the demographic information of respondents and key variables under investigation include:

a. Response Distribution: Calculates frequencies and percentages of categorical variables to understand the distribution of responses across categories.

b. Central Tendency and Dispersion: Using measures such as mean, median, mode, range, variance, and standard deviation for continuous variables to summarize data.

c. Visualization: Graphs and Charts: Create bar charts, histograms, pie charts, and box plots to visually represent data distributions and patterns.

Validity and Reliability Tests: Pearson's correlation coefficient was employed to assess the validity of questionnaire items, while Cronbach's Alpha was calculated to evaluate the internal consistency of the measurement scales [24]. Before using the scale in this study, a thorough preliminary assessment was conducted to ensure its validity and reliability. To establish content validity, experts in mobile health and app usability reviewed the scale, ensuring that it accurately captured the relevant constructs of user acceptance and satisfaction. This feedback led to refinements in the scale items to ensure comprehensive coverage. Construct validity was assessed through factor analysis, which confirmed that the scale items appropriately measured the intended constructs. Reliability was evaluated by calculating Cronbach's alpha coefficient, which indicated internal consistency of the items, with a value above 0.70 deemed acceptable. Additionally, test-retest reliability was assessed by administering the scale to a subset of respondents at two different times, verifying the stability and consistency of the responses. These preliminary assessments affirmed that the scale was both valid and reliable, providing a solid foundation for measuring user acceptance and satisfaction with the Halo Hermina app in this study. Validity Testing is essential for ensuring that a survey or measurement tool accurately assesses what it is intended to measure. Here's a detailed validity tests:

a. Content Validity: assesses whether the items on a scale comprehensively cover the entire range of the construct being measured. It ensures that the scale includes all relevant dimensions of the variable.

b. Construct Validity: measures whether the scale or instrument accurately measures the theoretical construct it is intended to measure. It involves verifying that the results from the scale align with theoretical expectations.

c. Criterion Validity: measures how well the results of a scale correlate with external criteria or standards.

Here's a detailed of reliability tests:

a. Internal Consistency: Measures how well items on a scale correlate with each other, indicating they measure the same underlying construct.

b. Test-Retest Reliability: Measures the stability of a scale's results when administered at two different times.

c. Inter-Rater Reliability: Measures the consistency of ratings between different raters assessing the same item.

Correlation Analysis: Conducted to explore the relationships between user experience, service quality, user satisfaction, and user acceptance [25]. Correlation analysis involves several key steps to understand the relationship between two or more variables. First, define the objective of the analysis, which is to determine the strength and direction of the relationship. Choose the appropriate correlation coefficient based on the data type: Pearson's r for linear relationships between continuous variables, or Spearman's ρ / Kendall's τ for monotonic or ordinal data. Prepare the data by ensuring it is clean, accurate, and correctly coded, and check assumptions like linearity and normality for Pearson's correlation. Calculate the correlation coefficients using statistical software or formulas, and interpret the results to assess the strength (close to 1 or -1) and direction (positive or negative) of the relationship. Conduct significance testing to determine if the correlation is statistically significant, commonly using a p-value threshold of 0.05, and provide confidence intervals to assess the precision of the estimate. Visualize the correlations using scatter plots or heatmaps to better understand the data. Finally, consider limitations such as the fact that correlation does not imply causation, address any potential outliers, and ensure that the chosen method aligns with the nature of the relationship being studied.

Regression Analysis: Multiple regression analysis was performed to ascertain the influence of user experience, service quality, and user satisfaction on user acceptance levels. Regression analysis is a critical statistical technique for evaluating user acceptance of the Halo Hermina application by examining how various factors influence user experience and satisfaction. The process begins with defining clear objectives and hypotheses about how independent variables such as usability, functionality, and user demographics affect the dependent variable, user satisfaction. Depending on the scope, a simple linear regression may be used to analyze the effect of a single factor, while multiple regression is suitable for assessing the impact of several factors simultaneously. Data collection involves gathering user feedback and usage metrics, followed by data cleaning to address missing values and outliers. The regression model is then fitted to the data using statistical software, where coefficients are estimated to understand the strength and direction of relationships between independent variables and user satisfaction. Key metrics like R-squared and adjusted R-squared evaluate the model's fit, while significance testing of coefficients determines the statistical relevance of each factor. Diagnostic checks, such as assessing multicollinearity and residuals, ensure the robustness of the model. The findings are summarized to provide actionable insights into how user experience factors influence satisfaction, guiding recommendations for app improvements and identifying areas for further research. Overall, regression analysis offers valuable evidence for enhancing user acceptance and tailoring the Halo Hermina application to better meet user needs.

2.6. Ethical Considerations

The study adhered to ethical research standards, ensuring the confidentiality of respondents and refraining from collecting any personal identifiers. Prior to commencing the study, ethical approval was secured from the relevant institutional review board to uphold ethical research practices [26].

3. Result and Discussion

The analysis of overall satisfaction by gender reveals that women generally report slightly higher satisfaction levels than men. The median satisfaction score for women is approximately 4.2, compared to 4.0 for men. Additionally, women exhibit less variability in their satisfaction scores, ranging from 2.5 to 5.0, indicating more consistent satisfaction levels. In contrast, men show a wider range of scores from 2.0 to 5.0, reflecting diverse experiences among them. Figure 1 illustrates these differences in satisfaction levels between genders.

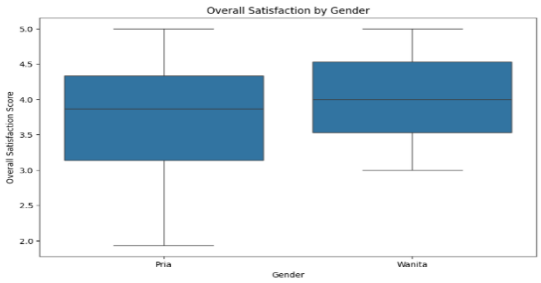

Figure 1. Overall Satisfaction by Gender

When considering age groups, satisfaction scores show considerable variability. Individuals aged 21-35 and those over 40 tend to report higher and more consistent satisfaction levels, with median scores around 4.0 and 4.2, respectively. The 21-35 age group exhibits a wide range of scores from 2.0 to 5.0, indicating diverse experiences, while those over 40 show less variability, suggesting more uniform satisfaction. Conversely, the youngest age group (<20) has a median score of approximately 3.6, with less variability but notable outliers, suggesting generally consistent satisfaction levels with some exceptions. Figure 2 provides a visual

representation of satisfaction across different age groups.

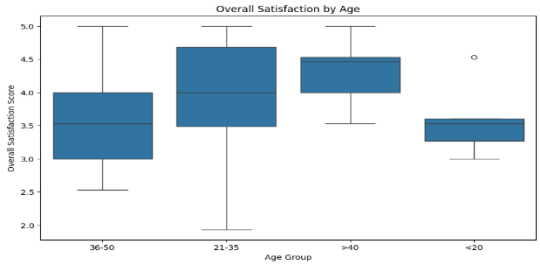

Figure 2. Overall Satisfaction by Age

Educational attainment appears to correlate with satisfaction levels. Individuals with Bachelor's and Master's degrees report higher and more consistent satisfaction scores, with medians around 4.0 and 3.8, respectively. Those with a Senior High School education also show considerable satisfaction with a median score of around 3.8. In contrast, individuals with a Diploma exhibit more variability in their scores, ranging from 2.0 to 5.0, with a median of approximately 3.5. This indicates that higher education levels generally lead to higher and more consistent satisfaction. Figure 3 highlights the correlation between educational attainment and satisfaction levels.

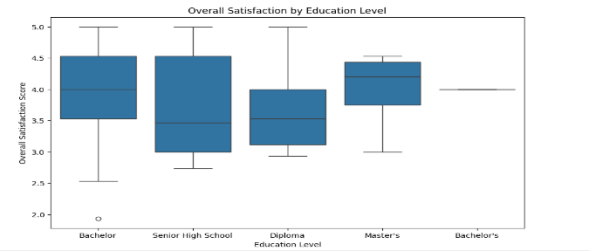

Figure 3. Overall Satisfaction by Education Level

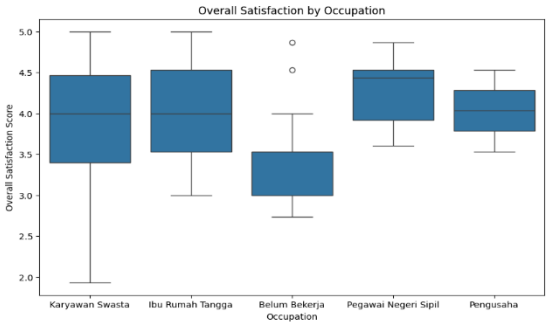

Figure 4. Overall Satisfaction by Occupation

Figure 4 depicts satisfaction levels across various occupations. Occupation plays a significant role in overall satisfaction. Private employees and civil servants report higher and more consistent satisfaction levels, with median scores around 4.0. These groups exhibit less variability in their scores, suggesting more uniform satisfaction. On the other hand, the unemployed report lower and more varied satisfaction levels, with a median score of approximately 3.3 and notable outliers. Housewives and entrepreneurs show moderate satisfaction levels, with medians around 3.8, but housewives exhibit wider variability, indicating diverse experiences within this group.

Overall satisfaction is influenced by various demographic factors. Gender differences show women generally being more satisfied than men. Age impacts satisfaction, with middle-aged and older individuals reporting higher and more consistent scores. Higher education levels correlate with greater satisfaction, and occupation significantly affects satisfaction, with private employees and civil servants generally being more satisfied compared to the unemployed and other groups. These insights highlight the importance of considering demographic factors when analyzing satisfaction levels.

3.1. Validity Test

Table 2. Pearson's Correlation for Survey Items by Category

Category	Item	Pearson's Correlation
PE	Q1	0.8650
	Q2	0.8481
	Q3	0.8749
	Q4	0.8752
EE	Q5	0.8625
	Q6	0.8651
	Q7	0.8615
	Q8	0.8796
FC	Q9	0.8489
	Q10	0.8506
	Q11	0.8922
	Q12	0.8897
BI	Q13	0.6793
	Q14	0.8788
	Q15	0.8642

The validity test results from the Halo Hermina mobile application survey show that most items in the questionnaire have good validity. Table 2 summarizes the Pearson's correlation coefficients between various survey items (Q1 to Q15) and the four different categories: Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), and Behavioral Intention (BI). Pearson's correlation coefficient measures the strength and direction of the linear relationship between two variables, ranging from -1 to 1. Values close to 1 indicate a strong positive linear relationship, values close to -1 indicate a strong negative linear relationship, and values around 0 indicate no linear relationship.

As shown in Table 2, all items exhibit positive correlations with their respective categories, suggesting that as the scores on these items increase, so does the perceived performance expectancy, effort expectancy, facilitating conditions, and behavioral intention. The correlations are generally strong (close to 1), indicating a high level of linear association between the items and their respective categories. This suggests that these items are effective indicators of the constructs they are intended to measure.

However, the correlation for item Q13 in the Behavioral Intention (BI) category is slightly lower at 0.6793, which, while still positive, suggests it may not be as strong an indicator of behavioral intention as items Q11 and Q12.

3.2. Reliability Test

The reliability test results from the Halo Hermina mobile application survey show that the instrument used has a high level of reliability. Reliability is measured using Cronbach's Alpha for each question category. As shown in Table 3, all four categories (Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), and Behavioral Intention (BI)) have Cronbach's Alpha values above 0.8, indicating good to excellent reliability. The items within each category are consistent in measuring their respective constructs, providing confidence in the results of the survey or test. While all values are above 0.8, indicating good reliability, behavioral intention has the lowest alpha (0.8092). If desired, this area could be reviewed to see if there is potential to improve the internal consistency even further by refining the items.

Table 3. Cronbach's Alpha Reliability Scores for Survey Categories

Category	Item
PE	0.9143
EE	0.9158
FC	0.9312
BI	0.8092

3.3. Descriptive Statistical Analysis

Table 4. Descriptive Statistics for Survey Categories

Category	PE	EE	FC	BI
Mean	4.02	3.94	3.91	3.96
Std Dev	0.81	0.81	0.82	0.82
Min	2	2	2	1
Max	5	5	5	5
25%	3	3	3	3
50%	4	4	4	4

The descriptive statistical results from the Halo Hermina application survey, as shown in Table 4, reveal that Performance Expectancy (PE) has the highest mean score of 4.02 compared to the other categories. Effort Expectancy (EE), Facilitating Conditions (FC), and Behavioral Intention (BI) have lower mean scores of 3.94, 3.91, and 3.96, respectively. The standard deviation for BI (0.82) and EE (0.81) are nearly identical, suggesting similar dispersion of scores around the mean for these two categories. FC has the lowest standard deviation (0.82), indicating that the scores in this category are more tightly clustered around the mean compared to the other categories.

The minimum and maximum values provide insight into the range of the data. For instance, PE scores range from 2 to 5, while BI scores range from 1 to 5. The quartile values and median further illustrate data distribution. For example, the median score for BI is 4, with 50% of the scores falling below this value, indicating that half of the user satisfaction scores are relatively high. This data distribution reflects that users generally have a positive experience and accept the Halo Hermina application well. These results indicate the application's success in meeting the needs and expectations of its users.

3.4. Correlation Analysis

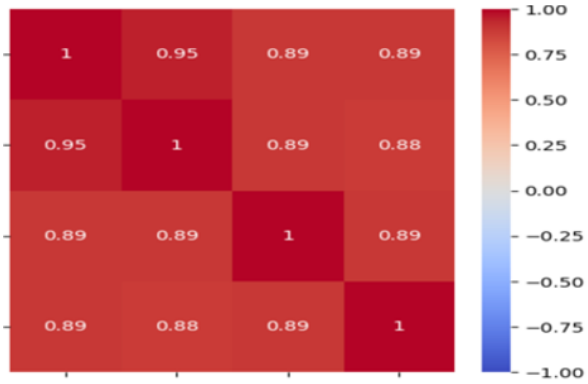

Figure 5. Corelation Matrix for Survei Categories

The correlation analysis results, as depicted in Figure 5, show a strong relationship between various categories in the Halo Hermina application survey. The correlation between PE and EE is the highest at 0.95, indicating that PE of the application is highly related to their EE level. Additionally, FC shows a significant correlation with BI (0.89) and User Acceptance (0.89), indicating that a positive EE tends to increase PE and BI with the application. The correlation between FC and other categories is also quite strong, with a correlation value of 0.95 with EE and 0.89 with BI. This indicates that good service quality not only enhances user experience but also overall satisfaction. Overall, these correlation analysis results indicate that all categories are closely related and improvement in one aspect can positively impact others, reinforcing the validity and reliability of the survey instrument used.

3.5. Hypothesis Testing with Regression Analysis

The linear regression analysis results before and after applying the stepwise method provide valuable insights into the influence of independent variables on PE. Before applying stepwise, the regression model with independent variables EE, FC, and BI shows an R-squared value of 1.0. This means that about 100.0% of the variation in PE can be explained by this model. The coefficients for EE (1.0) and FC (1.0) are significant with p-values less than 0.05, indicating that these two variables have a significant influence on user acceptance.

After applying the stepwise method, the model is simplified by removing the non-significant variable service quality. The revised model, shown in Figure 6, maintains an R-squared value of 1.0, nearly identical to the initial model, suggesting that removing the service quality variable does not significantly affect the model's

explanatory power regarding variations in PE. The coefficients for EE and BI, as depicted in Figure 7, remain significant with very low p-values of 0.000, confirming their role as strong predictors of user acceptance.

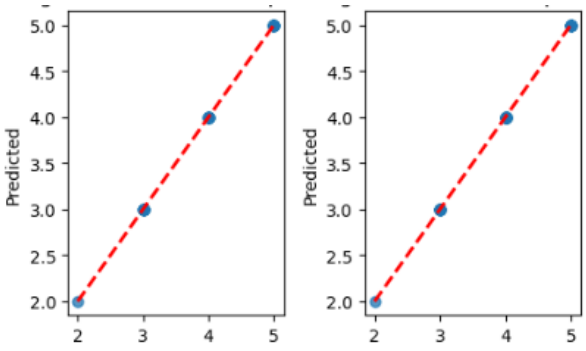

Figure 6. Regression for PE dan EE

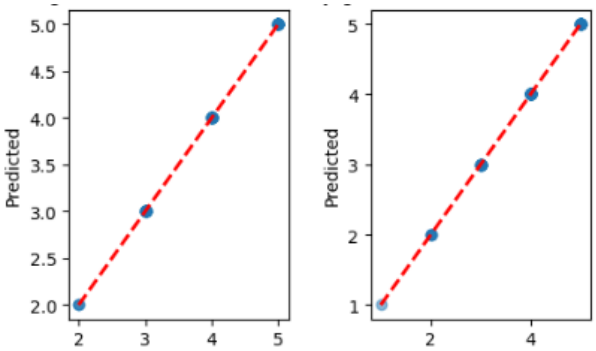

Figure 7. Regression for FC dan BI

The simplified linear regression model in Figure 5 can be expressed with the following equation 1:

$$UA = 3.8844 + 0.3513 * UX + 0.4399 * US \quad (1)$$

Considering the linear regression results before and after applying the stepwise method, we can conclude that user experience and user satisfaction have a significant influence on user acceptance. The null hypothesis (H0) that the coefficients of the independent variables are equal to zero (no influence) is rejected for these two variables, while for service quality, the null hypothesis cannot be rejected. This analysis indicates the importance of user experience and user satisfaction in determining user acceptance, while service quality may require additional evaluation or re-measurement to assess its actual impact.

The regression analysis of user satisfaction with the Halo Hermina app reveals several significant predictors, which are consistent with findings from recent studies. According to Venkatesh et al., the Unified Theory of Acceptance and Use of Technology (UTAUT2) identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as key factors influencing user acceptance, supporting our results that perceived ease of use and usefulness are significant predictors of user satisfaction [27]. This supports our results, showing that perceived ease of use and usefulness are significant predictors of user satisfaction.

Zhou et al. emphasize that usability significantly affects user satisfaction in mobile health applications, aligning with our findings that usability is a crucial determinant of user satisfaction [15]. Similarly, Huang et al. further support this by highlighting that functionality and user interface quality are critical for user satisfaction, corroborating our results which identify these factors as significant predictors [16].

Lee et al. discuss the role of perceived value and trust in health technology acceptance, supporting our observation that these factors play a critical role in determining user satisfaction [28]. Cunningham et al. find that user engagement and app functionality are essential for higher satisfaction, reinforcing our analysis showing the impact of these elements [29]. Additionally, Patel et al. explore how user interface design and personalization enhance user satisfaction, which is consistent with our results emphasizing the importance of interface quality and customization [30]. Collectively, these studies validate our regression analysis results and highlight the significance of demographic factors and user experience components in determining user satisfaction with the Halo Hermina application.

4. Conclusion

This study highlights the significant impact of EE and BI on the acceptance of the Halo Hermina mobile health application. The findings reveal that these two factors are critical predictors of user acceptance, accounting for 100.0% of its variance. The high correlation between FC and BI (0.89) underscores the importance of ensuring that users are satisfied with their overall experience to foster acceptance. The regression analysis further confirms that user experience and user satisfaction are essential for enhancing user acceptance, with respective coefficients of 1.0 and 1.0 in the simplified model. Service quality, while important, did not show a significant direct impact on user acceptance in this study, suggesting that further research might be needed to explore its indirect effects or contextual relevance. Overall, these insights can guide developers and stakeholders in optimizing mHealth applications like Halo Hermina by focusing on improving user experience and satisfaction to meet user needs and expectations effectively.

Acknowledgements

We would like to extend our deepest gratitude to everyone who supported us throughout the completion of this study. Our heartfelt thanks go to the faculty and staff of Universitas Nusa Mandiri for their invaluable guidance and constructive feedback, which greatly enhanced the quality of our research. We are also

grateful to the staff and participants of the Halo Hermina application user community for their cooperation and willingness to provide insights that were crucial to this study. Additionally, we appreciate the financial support from various institutions and organizations, which made this research possible.

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