

## Ease of Use and Usefulness in Library Self-Service: Evidence from Universitas Sebelas Maret Library

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DOI: <http://dx.doi.org/10.30742/tb.v9i2.4494>

Received: 1 June 2025

Revised: 22 September 2025

Accepted: 29 September 2025

### ABSTRACT

**Purpose Research:** Digital transformation in academic libraries drives service innovation to meet the evolving needs of users. This study examines the influence of perceived ease of use and perceived usefulness on user satisfaction with self-service borrowing at the Sebelas Maret University Library. Understanding these factors is critical for enhancing service quality and fostering user loyalty in digital library environments. **Research Method:** This study employs a quantitative survey design. Data were collected from 30 active users of the self-service borrowing system at Sebelas Maret University Library via structured questionnaires administered online. Respondents' perceptions of ease of use, usefulness, and satisfaction were measured using a Likert scale. **Data Analysis:** Descriptive statistics were used to summarize respondents' perceptions. Simple linear regression analysis was conducted to assess the effects of perceived ease of use and perceived usefulness on user satisfaction. All analyses were performed using SPSS software. **Results:** Descriptive analysis revealed mean scores of 3.29 for both perceived ease of use and perceived usefulness, and 3.15 for user satisfaction. Regression results demonstrated that perceived ease of use ( $\beta = 0.56$ ,  $p = 0.005$ ) and perceived usefulness ( $\beta = 0.51$ ,  $p = 0.010$ ) significantly influenced user satisfaction, explaining 21–25% of the variance. **Conclusions:** The findings confirm that perceived ease of use and perceived usefulness are significant determinants of user satisfaction with self-service borrowing systems. Academic libraries should prioritize the development of intuitive, efficient, and beneficial services to enhance user satisfaction and loyalty. Future research should incorporate larger samples and additional variables to deepen the understanding of factors influencing satisfaction in digital library services.

**Keywords:** Perceived Ease of Use; Perceived Usefulness; User Satisfaction; Academic Library

### A. INTRODUCTION

Advancements in information technology have significantly impacted various aspects of life, including higher education. The ease of information access offered by digital technology has prompted academic libraries to transform into more modern and responsive institutions that cater to user needs (Wheeler et al., 2022). This transformation encompasses the digitization of collections and the development of services oriented toward user satisfaction. Academic libraries

serve as vital information centers for students and faculty, supporting learning, research, and academic development (Husnah et al., 2024). Libraries are expected to fulfill educational needs, preserve information, and provide recreational services for users through professionally managed and standardized systems. Service quality is key to fostering user satisfaction within libraries (Bae & Cha, 2015). Satisfaction arises when users' expectations of services are met or exceeded. As part of service improvement efforts, libraries must provide systems that facilitate users' access to and borrowing of collections. Circulation services, in particular, play a crucial role in ensuring the ease and speed of service delivery (Gordon, 2021).

The adoption of technology-based self-service borrowing represents one of the key innovations widely implemented in modern libraries to enhance service quality. Pratiwi and Suprihatin (2019) examined the usability of self-service borrowing at Brawijaya University Library and found that learnability, efficiency, memorability, and satisfaction significantly influenced the perceived usefulness of the service. Their study also recommended developing an Android-based application to improve self-service borrowing. Similarly, Adyolga and Ardoni (2023) reported that most users at Andalas University Library were satisfied with self-service borrowing based on ease of use, reliability, efficiency, convenience, and security. Previous studies predominantly employed descriptive and usability approaches to assess self-service borrowing.

This study is inspired by previous research that assessed self-service borrowing through descriptive and usability approaches. However, it differs by adopting the theoretical framework of the Technology Acceptance Model (TAM) by Davis (1989) to examine the effect of perceived ease of use and perceived usefulness on user satisfaction with self-service borrowing. Analytical approaches employing correlation and simple linear regression analyses are applied to strengthen the examination of relationships between variables. Given the limited application of TAM in evaluating self-service borrowing in Indonesian academic libraries, this study aims to fill this gap by providing a deeper theoretical perspective. The evaluation of library services is crucial to ensuring quality and sustainability (Ajith, Ramanayaka, & Weerasooriya, 2025), as stipulated in accreditation instruments from the National Library of Indonesia, which cover collections, facilities and infrastructure, services, library personnel, innovation, and community literacy (National Library of the Republic of Indonesia, 2022).

This research evaluates self-service borrowing at UPT Universitas Sebelas Maret Library (UNS Library) using the TAM framework proposed by Davis (1989). The research questions include: (1) how users perceive the ease of use and usefulness of the self-service borrowing system; (2) the level of user satisfaction with the service; and (3) whether perceived ease of use and perceived usefulness individually and simultaneously have a significant effect on user satisfaction. Accordingly, the objectives are to assess perceptions of ease of use and usefulness of the self-service borrowing system at UNS Library, measure user satisfaction, and analyze the effect of these perceptions on satisfaction both partially and simultaneously. This approach is expected to provide a comprehensive understanding of factors determining user satisfaction in the context of self-service borrowing in academic libraries.

## B. METHODS

This study employs a quantitative survey methodology incorporating both descriptive and analytical approaches. The descriptive approach aims to capture users' perceptions of ease of use, perceived usefulness, and satisfaction with the self-service borrowing system at the UNS Library. The analytical approach is utilized to examine the partial effects of perceived ease of use and perceived usefulness on user satisfaction, grounded in the Technology Acceptance Model (TAM) framework proposed by Davis (1989).

Given the large, non-enumerated population of UNS students using the self-service borrowing system, we employed an exploratory design with purposive sampling of experienced users. We targeted  $n = 30$  as a pragmatic minimum for pilot work to obtain preliminary parameter estimates and assess feasibility, which is appropriate when the aim is estimation rather than hypothesis testing (Thabane et al., 2010; Hertzog, 2008). For initial instrument checks, about 30 cases are commonly deemed adequate (Johanson & Brooks, 2010), and the pilot literature notes simple rules of thumb ( $\geq 30$ ) alongside context-specific calculations (Whitehead et al., 2016). Findings are indicative and will inform sampling for a larger, probability-based study.

Recruitment used an opt-in, two-stage process. First, an invitation with a short eligibility and consent form was shared via broadcast messages to student class group channels. Eligible students who consented could provide a preferred contact for follow-up, such as WhatsApp or Instagram. Within forty-eight hours, they received a unique questionnaire link. The survey remained open for two weeks, with one reminder on day seven. Responses were time-stamped; submissions after 23 November 2024 were treated as non-responses. Identifiers were stored separately from survey data, used only to send the link and a single reminder, and deleted after data cleaning.

The questionnaire instrument was adapted and customized from the study by Xavier, Putra, and Anita (2023). Their research investigated customer satisfaction and continuance intention regarding using Self-service Kiosks in fast-food restaurants. They employed a quantitative methodology with purposive sampling and data collection via online questionnaires from 172 respondents in the Jakarta metropolitan area. Their study applied the SmartPLS statistical model, focusing on four primary variables, all yielding significant hypotheses, thereby demonstrating that Self-service Kiosks' user experience and user interface positively influence restaurant business sustainability.

The decision to adopt this questionnaire instrument was motivated by the similarity in context between self-service kiosks, despite differences in sector (libraries versus restaurants)—both share analogous service characteristics regarding user interaction with self-service technology. Consequently, indicators measuring ease of use, usefulness, and user satisfaction in the self-service context are pertinent and suitably adapted for this library-focused research. Table 1 presents the variables and indicators measured in the questionnaire.

Table 1. Operational Definitions of Variables

Variable	Indicator	Item
Perceived Ease of Use	Effort Required	The amount of effort required to use the self-service system
	Learnability	The ease with which users can learn to operate the service
	Ease of Use	The clarity and simplicity of using the service
	Accessibility of Assistance	The ease of obtaining help when using the service
	Overall Ease of Use	The general ease experienced when using the service
Perceived Usefulness	Time Efficiency	The extent to which the service saves time during the borrowing process
	Operational Efficiency	Improvement in borrowing efficiency within the library
	Service Convenience	The convenience provided by the library's service
	Borrowing Control	The degree of user control over the borrowing process
	Overall Benefit	The perceived overall benefits derived from the service
User Satisfaction	Enjoyment	The extent to which users feel pleased when using the service
	Positive Experience	The presence of positive experiences during service use
	Overall Satisfaction	The total level of satisfaction with the service
	Exceeding Expectations	The degree to which the service surpasses user expectations
	Meeting Technological Expectations	The extent to which the service meets expectations regarding self-service technology

The questionnaire employed a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree) to measure respondents' levels of perception and satisfaction. This study classified the mean scores of perceived ease of use, perceived usefulness, and user satisfaction based on a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). Average scores for each variable were analyzed and categorized according to predetermined intervals calculated using the scale range (RS) formula:

$$RS = \frac{M - n}{b}$$

where  $M$  denotes the highest scale value (4),  $n$  the lowest scale value (1), and  $b$  the number of categories (4) (Usadha & Sucandrawati, 2024). The calculated RS value of 0.75 defined the following satisfaction classification intervals:

- Very Satisfied (VS):  $3.25 \leq X \leq 4.00$
- Satisfied (S):  $2.50 \leq X < 3.25$
- Somewhat Satisfied (SS):  $1.75 \leq X < 2.50$
- Dissatisfied (D):  $1.00 \leq X < 1.75$

The mean scores for each variable were compared against these intervals to determine levels of perceived ease of use, perceived usefulness, and user satisfaction. This classification facilitates a systematic and standardized quantitative interpretation of users' perceptions and satisfaction with the self-service borrowing system.

The analytical approach employed simple linear regression to assess the partial effects of each independent variable—perceived ease of use and perceived usefulness—on the dependent variable, user satisfaction. Simple linear regression was chosen because it effectively models the linear relationship between a single independent variable and a dependent variable separately. The simple linear regression equation, as outlined by Hair et al. (2010), is as follows:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

#### Notation

$Y$	: User satisfaction
$X$	: Independent variable
$\beta_0$	: Intercept
$\beta_1$	: Regression coefficient
$\varepsilon$	: Error term

Data analysis was performed using SPSS version 27 to obtain regression coefficients, significance levels ( $p$ -values), and the coefficient of determination ( $R^2$ ). Ethical protocols were rigorously followed by providing respondents with informed consent, which included comprehensive information about the study objectives, guarantees of data confidentiality, and the right to withdraw from the study at any time without penalty prior to completing the questionnaire. Strict measures were taken to ensure anonymity and confidentiality of the data, which were used exclusively for research purposes.

## C. RESULT AND DISCUSSION

The questionnaire data for this study were collected from 30 respondents who actively use the self-service borrowing system at the UNS Library. The sample size of 30 was selected per the minimum threshold recommended for quantitative research (Mascha & Vetter, 2018), which is adequate to provide an initial representative overview and permit the application of statistical analyses. The gender distribution among respondents was 73.3% female and 26.7% male, indicating an imbalance in gender representation within the sample. This disparity is attributable to the voluntary and online nature of data collection, which resulted in higher participation from female users meeting the service usage criteria. Nevertheless, this imbalance does not compromise the validity of the findings, as the study focuses on evaluating user perceptions and satisfaction with the service rather than demographic representativeness. The findings therefore accurately reflect the experiences of self-service borrowing users at UNS Library, with interpretation of results appropriately considering the demographic characteristics

of the participants. Table 2 presents the demographic data of respondents categorized by gender.

Table 2. Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	8	26.7
Female	22	73.3
Total	30	100

## I. Perceptions of Ease of Use, Perceived Usefulness, and User Satisfaction Regarding Self-Service Borrowing

### a. Perceptions of Ease of Use

Perceptions of ease of use regarding the self-service borrowing system were assessed through five key indicators on a 1–4 Likert scale. The indicator “requires little effort” received the highest mean score ( $M = 3.50$ ), indicating that access to the service is effortless. The indicator “easy to learn how to use” ( $M = 3.37$ ) reflects respondents’ rapid adaptation. The indicator “clear and easy to understand” ( $M = 3.27$ ) demonstrates that instructions and the interface are readily comprehended. Regarding the indicator “easy to obtain help” ( $M = 3.10$ ), respondents felt sufficiently assisted, though opportunities remain to enhance support services. The indicator “overall easy to use” ( $M = 3.20$ ) confirms a consistently positive perception. The overall mean score across all indicators was 3.29, placing it within the “**very satisfied**” category. All indicators exhibited a standard deviation of approximately 0.6, suggesting consistent perceptions of ease of use among respondents. These findings confirm that the self-service borrowing system at UNS Library fulfills user expectations concerning ease of use, a critical factor in fostering adoption and satisfaction. Table 3 presents the results of the data analysis on perceptions of ease of use of the self-service borrowing system.

Table 3. Analysis of Perceived Ease of Use of the Self-Service Borrowing System

Code	Statement	Mean	SD
XI-1	I do not require much effort to use the self-service system.	3.50	0.68
XI-2	I am able to quickly learn how to use the self-service borrowing system.	3.37	0.56
XI-3	The self-service borrowing system is clear and easy to understand.	3.27	0.64
XI-4	I find it very easy to obtain assistance when using the self-service borrowing system.	3.10	0.61
XI-5	Overall, the self-service borrowing system is easy to use.	3.20	0.61
Average		3.29	

## b. Perceived Usefulness

Perceptions of the usefulness of the self-service borrowing system were evaluated using five key indicators. The indicator "increases efficiency" received the highest score ( $M = 3.43$ ), followed by "very useful" ( $M = 3.33$ ) and "provides control" ( $M = 3.30$ ), indicating that the service assists users in both efficiency and control over the borrowing process. The indicators "saves time" ( $M = 3.20$ ) and "makes borrowing easier" ( $M = 3.17$ ) also received high scores, highlighting that the service provides significant benefits in accelerating and simplifying the borrowing process. The relatively small standard deviation values suggest consistent perceptions of usefulness among respondents. The analysis results show that all indicators received an average score above 3, with an overall mean of 3.29, placing them in the **"very satisfied"** category. All indicators exhibited a standard deviation of approximately 0.5, demonstrating consistency in perceptions of usefulness across respondents. Overall, these results confirm that the self-service borrowing system at UNS Library meets users' expectations regarding usefulness, contributing to increased usage and service satisfaction. Table 4 presents the results of the data analysis on perceptions of the usefulness of the self-service borrowing system.

Table 4. Analysis of Perceived Usefulness of the Self-Service Borrowing System

Code	Statement	Mean	SD
X2-1	Saves time and completes the borrowing process quickly	3.20	0.61
X2-2	Increases the efficiency of borrowing at UNS Library	3.43	0.50
X2-3	Makes the self-service borrowing process easier	3.17	0.53
X2-4	Gives me control over completing the borrowing process	3.30	0.53
X2-5	Overall, the self-service borrowing system is very useful	3.33	0.48
Average		3.29	

## c. User Satisfaction

User satisfaction with the self-service borrowing system was evaluated based on five key indicators. The indicator "pleasant experience" received the highest score ( $M = 3.30$ ), followed by "service features meet expectations" ( $M = 3.23$ ) and "enjoyment while using the service" ( $M = 3.13$ ), indicating that respondents had positive experiences and found the service to align with their expectations. The indicators "satisfied with the service" ( $M = 3.10$ ) and "service exceeds expectations" ( $M = 2.97$ ) also received high scores, although slightly lower than the other indicators, suggesting that while the majority of users were satisfied, there is still room for improvement to exceed their expectations. The relatively small standard deviations highlight consistent perceptions of satisfaction among respondents. The analysis revealed that all indicators achieved an average score of 3.15, placing them in the **"satisfied"** category. The standard deviations for each indicator ranged from 0.50 to 0.61, indicating consistent satisfaction perceptions



among respondents. These findings confirm that the self-service borrowing system at UNS Library has provided a satisfying experience that meets user expectations. Table 5 presents the results of the data analysis on user satisfaction with the self-service borrowing system.

Table 5. Analysis of User Satisfaction with the Self-Service Borrowing System

Code	Statement	Mean	SD
Y1-1	I feel pleased when using the self-service borrowing system.	3.13	0.51
Y1-2	The experience of using the self-service borrowing system is enjoyable.	3.30	0.53
Y1-3	Overall, I am satisfied with the self-service borrowing system.	3.10	0.55
Y1-4	The self-service borrowing system exceeds my expectations.	2.97	0.61
Y1-5	The features of the self-service borrowing system meet my expectations.	3.23	0.50
Average		3.15	

The findings of this study indicate that perceptions of ease of use of the self-service borrowing system at UNS Library are high and consistent, with an average indicator score of 3.29 on a 1–4 Likert scale and a standard deviation of approximately 0.6. These results confirm that most respondents perceive the self-service borrowing system as highly accessible, easy to learn, and easy to operate for borrowing collections. The high scores on the indicators "requires little effort" and "easy to learn" reflect the ease of access and user adaptation to the self-service system. These findings are consistent with the TAM proposed by Davis (1989), which suggests that perceived ease of use is a key determinant in technology acceptance. Perceptions of ease of use increase the intention to use the system and play a crucial role in creating a positive user experience (Park et al., 2009).

In the dimension of perceived usefulness, all indicators received average scores above 3, with a composite mean of 3.29 and a standard deviation of approximately 0.5. Most respondents regarded the service as highly beneficial in speeding up, simplifying, and controlling the borrowing process. These findings corroborate the research by Pratiwi and Suprihatin (2019) and Adyolga and Ardoni (2023), indicating that the efficiency and convenience of self-service systems positively correlate with user satisfaction. The study by Xavier, Putra, and Anita (2023) on self-service systems in other sectors also emphasizes the importance of perceived usefulness in enhancing user loyalty and experience.

User satisfaction with the self-service borrowing system was also high, with an average indicator score of 3.15 and standard deviations ranging from 0.50 to 0.61. The indicators "pleasant experience" and "features meet expectations" received the highest scores, indicating that users had a positive experience that met their expectations. These findings align with the study by Bae and Cha (2015), which underscores that user satisfaction is influenced by the fulfillment of expectations regarding ease of use, usefulness, and service quality.



Some indicators with lower scores, such as "easy to get help" and "service exceeds expectations," suggest that there is room for improvement in technical support and service feature innovation to enhance user satisfaction further. Overall, these results reinforce the relevance of the theoretical framework and previous research, confirming that ease of use and perceived usefulness are fundamental factors in creating a satisfying user experience in academic library environments.

## 2. The Impact of Perceived Ease of Use and Perceived Usefulness on User Satisfaction

Simple linear regression analysis was employed to examine the impact of perceived ease of use and perceived usefulness on user satisfaction with the self-service borrowing system at the UNS Library. The analysis commenced with testing the residuals' normality assumption using the Shapiro-Wilk test. A p-value  $> 0.05$  for both models indicated that the residuals were normally distributed, thus satisfying the regression assumption.

The regression coefficient for perceived ease of use was 0.56 ( $SE = 0.18$ ;  $t = 3.06$ ;  $p = 0.005$ ;  $R^2 = 0.25$ ), suggesting that higher perceptions of ease of use are associated with increased user satisfaction. The regression coefficient for perceived usefulness was 0.51 ( $SE = 0.18$ ;  $t = 2.76$ ;  $p = 0.010$ ;  $R^2 = 0.21$ ), confirming that positive perceptions of usefulness contribute to greater user satisfaction.

The  $R^2$  values for each model indicate that perceived ease of use and perceived usefulness explain 25% and 21%, respectively, of the variation in user satisfaction. The significant p-values for both variables further strengthen the conclusion that ease of use and usefulness are fundamental factors in shaping user satisfaction. These findings underscore that the self-service borrowing system at UNS Library fulfills its primary service function and provides a satisfying experience for users. Table 6 presents the results of this study's simple linear regression analysis.

Table 6. Simple Linear Regression Analysis of Predictor Variables on User Satisfaction

Model/Variable	B	SE	t	p	R <sup>2</sup>
Ease of Use (X1) → Satisfaction (Y1)	0.56	0.18	3.06	0.005	0.25
Usefulness (X2) → Satisfaction (Y1)	0.51	0.18	2.76	0.010	0.21

The regression analysis shows a probabilistic association between perceived ease of use, perceived usefulness, and user satisfaction with the self-service borrowing system at UNS Library. In the TAM, ease of use lowers cognitive effort and raises perceived usefulness; both mechanisms are linked to higher satisfaction and continued use (Davis, 1989; Venkatesh et al., 2003). Our results suggest that ease and usefulness are important, but not exclusive, drivers of satisfaction.

This interpretation is consistent with prior evidence. Users who perceive systems as easy to use report higher satisfaction and greater willingness to recommend services (Pratiwi & Suprihatin, 2019). In library contexts, positive

perceptions of efficiency and ease increase the likelihood of satisfaction and repeat use (Adyolga & Ardoni, 2023). In self-service settings beyond libraries, perceived usefulness and ease predict satisfaction and loyalty (Xavier, Putra, & Anita, 2023). Evidence from self-service technologies further shows that small interaction frictions, unclear prompts, and recovery difficulties can lower perceived quality and satisfaction even when the core function is intact (Meuter et al., 2000). In our setting, students often use the system between classes, so task fluency and error recovery matter as much as core functionality. This aligns with service quality research, where usability, reliability, and responsiveness shape perceived performance and satisfaction in digital services (Parasuraman et al., 2005; Zeithaml et al., 2002).

Taken together, the pattern indicates two complementary routes for improvement. First, direct gains arise from simplifying steps and reducing errors. Second, indirect gains arise when better usability increases perceived usefulness, supporting satisfaction and continued use (Venkatesh et al., 2003; Bhattacharjee, 2001). Recent work reaches a similar conclusion, noting that ease and usefulness improvements increase immediate satisfaction and longer-term behaviours such as loyalty, continued usage intention, and positive word of mouth (Elias & Lubua, 2024).

The practical message is clear. To raise satisfaction, the self-service system should streamline on-screen flows, make help and recovery actions visible at the point of need, and track soft process indicators such as repeat scans and time to completion. Given the exploratory nature of our sample, these findings should be viewed as indicative; they provide a basis for a larger, probability-based study with sufficient power to estimate effects more precisely (Hertzog, 2008; Thabane et al., 2010). A user-friendly and functional academic library self-service system is strongly associated with higher user satisfaction. Enhancing ease of use and usefulness remains essential to optimise performance, build user loyalty, and make library services more adaptive and responsive to user needs.

The findings indicate that a user-friendly and functional academic library self-service system is strongly associated with higher user satisfaction. Improving ease of use and usefulness is essential to optimise service performance, build user loyalty, and make library services more adaptive and responsive to user needs.

## **E. CONCLUSION**

This study emphasizes that perceptions of ease of use and usefulness play a critical role in shaping user satisfaction with the self-service borrowing system at UNS Library. All indicators for these two variables fall within the high and consistent categories, indicating that the service system has met user expectations regarding accessibility, efficiency, and practical benefits in borrowing collections. These findings offer practical insights for library management to continue developing user-friendly and adaptive self-service features that align with users' needs, enhancing satisfaction and loyalty while strengthening the institution's image as a modern, technology-based library. Future research should involve a larger sample of respondents and a broader institutional scope, as well as integrate a mixed-methods approach or include additional variables, such as digital service

quality and user experience, to provide a more comprehensive and relevant analysis of user satisfaction in light of the ongoing digital transformation in the library and information fields.

## ACKNOWLEDGMENTS

The authors sincerely thank the anonymous reviewers for their valuable and constructive feedback, which played a crucial role in enhancing the quality of this article. Additionally, the authors recognize the assistance of ChatGPT (OpenAI, GPT-4 version) for language proofreading during the manuscript preparation. The final version of the content was thoroughly reviewed and revised by the authors.

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