International Journal of Management Science and Information Technology
IJMSIT

E-ISSN: 2774-5694 P-ISSN: 2776-7388 OPEN ACCESS

Volume 4 (2), July-December 2024, 167-177
DOI: https://doi.org/10.35870/ijmsit.v4i2.2775

Empowering Government Fiscal Efficiency: Usability Evaluation and E-Government Model Refinement

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Article history:
Received June 28, 2024
Revised July 2, 2024
Accepted July 6, 2024

Abstract

In the current digital transformation landscape, governments increasingly rely on electronic systems for financial management, yet the effectiveness of these systems often hinges on their usability and adaptability to evolving user needs. This study addresses these challenges by evaluating the usability of existing e-government applications for financial management and refining e-government models to enhance their efficiency, transparency, and accessibility. Through a comprehensive evaluation encompassing Nielsen's five usability categories—Learnability, Memorability, Efficiency, Error, and Satisfaction—alongside methodologies such as user surveys, usability testing, and expert evaluations, the research aims to identify areas for improvement within existing systems and refine e-government models. The expected outcomes include insights into usability challenges, empowerment of governments with more efficient fiscal management tools, and contributions to the broader discourse on optimizing public sector performance in the digital age. These efforts have the potential to significantly impact government fiscal efficiency and transparency, leading to better resource allocation, reduced waste, and increased accountability in public service delivery.

Keywords:
E-government; Usability evaluation; Fiscal efficiency; Digital transformation; Public sector governance.

1. INTRODUCTION

In recent years, the rapid advancement of digital technologies has significantly transformed various aspects of governance, particularly in financial management within the public sector (Jansen et al., 2023; Wibisono et al., 2022). E-government applications have become instrumental in modernizing government operations, enhancing transparency, and improving the efficiency of fiscal processes (Criado et al., 2023; Meijer et al., 2019). These systems facilitate better resource allocation, reduce operational costs, and increase accountability (Jilcha & Kebede, 2020). However, the success of these applications largely depends on their usability, which includes ease of learning, efficiency of use, error management, and user satisfaction (Alharbi & Drew, 2020; Arshad & Khurram, 2020; Lang, 2002). Ensuring that e-government financial management systems are user-friendly is crucial for realizing their potential benefits and encouraging widespread adoption among government employees and stakeholders (Nações Unidas, 2020).

Despite implementing e-government systems, many governments struggle to optimize these tools to meet their users' evolving needs and expectations. Usability issues, such as difficulty in navigation, inefficiency, frequent errors, and lack of user satisfaction, can lead to operational inefficiencies, user frustration, and resistance to new technologies (Margetts & Dunleavy, 2013). These challenges underscore the need for a comprehensive evaluation of the usability of existing e-government applications and a refinement of these systems based on user feedback and expert analysis. Addressing these usability challenges is essential for enhancing the overall performance of fiscal management systems and fostering more effective governance.

This study aims to bridge the gap between the theoretical potential of e-government applications and their practical effectiveness in financial management. The research objectives are to evaluate the usability of current e-government financial management systems, identify specific areas for improvement, and refine e-

government models to enhance efficiency, transparency, and accessibility. The study employs a detailed evaluation framework based on Nielsen's five usability categories—Learnability, Memorability, Efficiency, Error, and Satisfaction (Lang, 2002). The research seeks to gather comprehensive data on user experiences and provide actionable insights for system refinement using user surveys, usability testing, and expert evaluations.

A review of existing literature reveals a growing body of research focused on the digital transformation of public sector governance (Putra & Er, 2024). Studies have highlighted the importance of usability in e-government applications and its impact on user adoption and system effectiveness (OECD Comparative Study, 2016; Putra & Er, 2024). Research has explored various factors influencing the usability of e-government systems, such as user interface design, system functionality, and user training (Al-Farsi, 2020). Despite these contributions, there remains a need for more empirical research explicitly targeting the usability of financial management applications within e-government, which this study aims to address.

In conclusion, this research seeks to empower governments with more efficient fiscal management tools by evaluating and refining the usability of e-government applications. By addressing the identified usability challenges, the study aims to enhance the efficiency, transparency, and accessibility of these systems. The expected outcomes include improved government fiscal efficiency, better resource allocation, reduced waste, and increased accountability in public service delivery. The insights gained will also contribute to the broader discourse on optimizing digital transformation in the public sector, offering valuable guidance for future initiatives to enhance e-government usability and effectiveness.

2. RESEARCH METHOD

In our comprehensive study on the usability of e-government financial management systems in local government institutions in West Sumatra, we meticulously follow a structured research flow to ensure thorough evaluation and impactful outcomes. Figure 1 illustrates the division of the research flow into five key phases: Preparation, Data Collection, Data Analysis, Model Refinement, and Validation and Reporting.

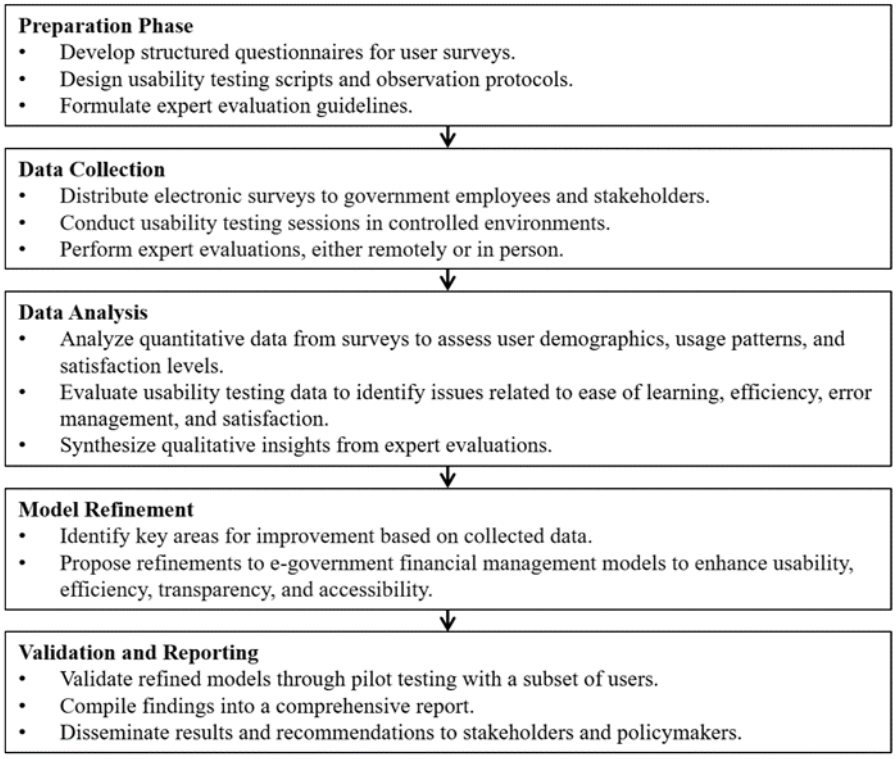

Figure 1. Flow of Research

In our comprehensive study on the usability of e-government financial management systems in local government institutions in West Sumatra, we follow a structured research flow comprising five key phases. The Preparation Phase involves developing structured questionnaires, designing usability testing scripts, and formulating expert evaluation guidelines. During the Data Collection Phase, we distribute electronic surveys, conduct usability testing sessions in controlled environments, and perform expert evaluations. In the Data Analysis Phase, we analyze quantitative survey data, evaluate usability testing data, and synthesize qualitative insights from expert evaluations. The Model Refinement Phase focuses on identifying areas for improvement and proposing refinements to enhance usability, efficiency, transparency, and accessibility.

Finally, in the Validation and Reporting Phase, we validate the refined models through pilot testing, compile our findings into a comprehensive report, and disseminate results to stakeholders and policymakers. This structured approach provides actionable insights and practical improvements for enhancing e-government financial management systems and optimizing public sector performance.

By meticulously following this structured research flow, we aim to deliver actionable insights and practical improvements that empower governments with more efficient fiscal management tools, thereby contributing to the broader discourse on optimizing public sector performance in the digital age. This study employs a mixed-methods approach to comprehensively evaluate the usability of existing e-government financial management systems and refine e-government models. The research design integrates quantitative and qualitative techniques to gather rich data on user experiences, perceptions, and system performance.

2.1. Tools and Approaches

We designed structured questionnaires to gather quantitative data on user demographics, usage patterns, satisfaction levels and perceived usability of e-government financial management systems (Davis, 1989). Surveys will be distributed electronically to government employees and stakeholders who interact with these systems regularly (Nações Unidas, 2020). We conducted controlled usability testing sessions with representative users to assess the ease of learning, use efficiency, error management, and overall satisfaction with e-government applications (Lang, 2002). We tasked participants with common financial management scenarios and observed and recorded their interactions with the systems (Grafton, 2006).

We engaged domain experts in e-government, usability, and financial management to provide qualitative system design, functionality, and usability assessments. Experts evaluated the systems based on established usability heuristics and best practices, providing insights into areas for improvement (Lang, 2002; Margetts & Dunleavy, 2013).

2.2. Scope and Objectives

The research evaluates and refines e-government financial management applications within local government institutions in West Sumatra, Indonesia. The scope includes budgeting, accounting, procurement, and revenue management systems specific to this region. The study targets government employees and stakeholders interacting directly with these systems within the local government context. The total number of respondents is 217 individuals representing various departments and roles within the local government (Janssen et al., 2021).

2.3. Primary Materials and Tools

We relied on structured surveys, usability testing scripts, observation protocols, and expert evaluation guidelines tailored to the local government context of West Sumatra (Al-Farsi, 2020). We utilized electronic survey platforms to distribute surveys, and we conducted usability testing using screen recording software and observation checklists. Expert evaluations involved heuristic evaluation techniques and structured assessment forms adapted to local government financial management's specific needs and challenges (OCDE, 2016).

2.4. Locations

We conducted data collection activities primarily within local government agencies and institutions in West Sumatra, where e-government financial management systems were deployed (Meijer et al., 2019). Our team conducted usability testing sessions in controlled environments such as usability labs or conference rooms equipped with the necessary technology, ensuring relevance to local conditions within the region. His approach allowed us to gather insights that accurately reflect the usability challenges and successes experienced in the specific operational contexts of West Sumatra's local government institutions.

2.5. Data Collection Techniques

We distributed surveys electronically via email or online survey platforms to government employees and stakeholders within local government institutions in West Sumatra, sending reminders to maximize response rates (United Nations, 2020). Our team scheduled usability testing sessions with participants recruited from target user groups within the region, and researchers trained in usability testing methodologies facilitated these sessions (Lang, 2002). Experts conducted evaluations remotely or in person, taking into account the geographical location and accessibility of local government experts (Meijer et al., 2019).

2.6. Operational Definitions of Research Variables

In our investigation, we are delving into the usability of e-government financial management systems within local government institutions in West Sumatra and entails examining:

a. Usability: How easily users can grasp these systems, how smoothly they operate, their error-free performance, and whether they leave users satisfied (Lang, 2002).

b. Efficiency: Assessing how well these systems streamline financial management tasks within the unique operational environment of local government entities in West Sumatra. Essentially, we are looking at how swiftly and effectively users can complete their tasks using these systems (Davis, 1989).
c. Transparency: Exploring the clarity and accessibility of financial information and processes within these e-government systems, specifically from the perspective of users within the local government setting of West Sumatra (Grafton, 2006).
d. Accessibility: Investigating the extent to which these systems cater to a wide range of user needs and preferences, ensuring inclusivity and usability for all users, including those with specific requirements tied to the local government context of West Sumatra (Al-Farsi, 2020).

3. RESULTS AND DISCUSSION

3.1. Preparation

In the Preparation Phase, we laid a strong foundation for our research. We developed structured questionnaires to gather quantitative data on user demographics, usage patterns, satisfaction levels, and perceived usability of e-government financial management systems. These questionnaires to ensure clarity and relevance, allowing us to obtain precise and valuable data from respondents (Table 1).

We also designed usability testing scripts and observation protocols. These tools facilitate clear and compelling observation of user interactions with the systems. Using these protocols ensured that our usability testing sessions would yield insightful and actionable data regarding user experience. Furthermore, we formulated expert evaluation guidelines based on established usability heuristics and best practices. These guidelines provide domain experts with a comprehensive framework for qualitative assessments. By adhering to these guidelines, experts could deliver detailed evaluations of the systems' design, functionality, and usability, highlighting critical areas for improvement. Overall, the Preparation Phase equipped us with the tools and guidelines to conduct thorough and practical research, setting the stage for subsequent data collection, analysis, model refinement, and validaStion phases.

Table 1. Questionnaire Usability Evaluation

Category	Label Question	Question
Learnability	Q1	learn how to use the website easily.
	Q2	find specific information easily.
	Q3	understand the content presented easily.
	Q4	navigate the website easily.
	Q5	learn to use the website without written instructions.
Memorability	Q6	remember how to use the website easily.
	Q7	remember the navigation paths to explore features and content easily.
	Q8	remember how to use the website after some time (>1 month).
Efficiency	Q9	access features quickly.
	Q10	find the information I am looking for quickly.
	Q11	complete tasks quickly.
Errors	Q12	encounter errors while using the website.
	Q13	fail to find the menu I am looking for.
	Q14	make a mistake while using the website, I find it difficult to correct.
Satisfaction	Q15	satisfied with the visual design of the website.
	Q16	feel comfortable using the website.
	Q17	the color composition and content placement are not confusing.
	Q18	the use of the website meets the expectations of my business.

3.2. Data Collection

The Data Collection phase involved gathering data through structured surveys and usability testing sessions. During the Data Collection phase, we gathered data using structured surveys, usability testing sessions, and expert evaluations to comprehensively understand user experiences with e-government financial management systems. We distributed electronic surveys via email and online survey platforms to government employees and stakeholders within local government institutions in West Sumatra (Figure 2). To maximize response rates, we sent reminders. The surveys gathered quantitative data on user demographics, usage patterns, satisfaction levels, and perceived usability. The response rate was high, ensuring a robust dataset for analysis (Kavanagh, 2015)

Usability testing sessions were conducted with participants recruited from target user groups within the region, facilitated by researchers trained in usability testing methodologies. These sessions occurred in controlled environments such as usability labs or conference rooms equipped with necessary technology, aiming to gain insights into the ease of learning, efficiency of use, error management, and overall satisfaction with e-government applications. Participants engaged in common financial management scenarios and their interactions with the systems were carefully observed and recorded. Expert evaluations were conducted remotely or in person, depending on the geographical location and accessibility of local government experts. Domain experts in e-government, usability, and financial management provided qualitative assessments of system design, functionality, and usability. Using heuristic evaluation techniques and structured assessment forms adapted to the specific needs and challenges of local government financial management, experts highlighted critical areas for improvement.

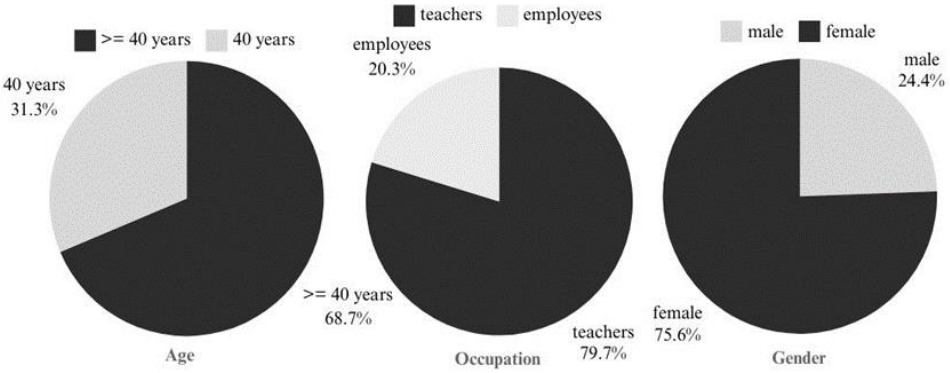

Figure 2. Respondents distribution

Figure 2 shows that most respondents were aged 40 years and above, with the youngest being 24 and the oldest 64. The most common age among respondents was 52 years. Then, figure 2 shows the gender distribution of respondents. Female respondents outnumbered male respondents, with 164 out of 217 respondents being female (75.6%) and 53 respondents (24.4%) being male. Figure 2 also illustrates the occupational distribution of respondents. The majority (80%) were teachers, while the remaining 20% were city employees of local government. Through these data collection activities, we gathered comprehensive data on user demographics, usability experiences, and expert insights, forming a solid foundation for subsequent analysis and model refinement phases.

3.3. Data Analysis

In the Data Analysis phase, we focused on interpreting the quantitative and qualitative data gathered from surveys, usability testing, and expert evaluations. This phase aimed to uncover trends, patterns, and key insights regarding the usability, efficiency, and overall satisfaction with the e-government financial management systems. Following the compilation of questionnaire results, we conducted descriptive statistical analysis to calculate the mean, median, and mode. This analysis uses statistical measures (Table 2) and Figure 3 show the comparation of mean percentage distribution respons per cotagory.

Table 2. Mean Percentage Distribution of Responses

Category	Question	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Learnability	Q1	0.9	7.4	21.7	52.5	17.5
	Q2	0	5.5	21.2	56.7	16.6
	Q3	0.5	5.1	19.4	58.5	16.6
	Q4	0	5.1	28.6	48.4	18
	Q5	0.5	18	28.6	40.1	12.9
Memorability	Q6	0.5	9.2	28.1	44.2	18
	Q7	0	8.8	27.2	47.5	16.6
	Q8	0.5	6.5	21.2	55.8	16.1
Efficiency	Q9	0	8.3	30.4	42.9	18.4
	Q10	0	4.1	26.3	52.5	17.1
	Q11	0.9	4.1	19.4	54.4	21.2
Errors	Q12	5.1	16.1	43.8	28.1	6.9

	Q13	12.9	37.3	38.7	9.2	1.8
	Q14	8.3	33.2	36.9	18	3.7
Satisfaction	Q15	0.9	2.8	29.5	52.1	14.7
	Q16	0	2.3	30.4	52.5	14.7
	Q17	0	2.8	30	51.2	16.1
	Q18	2.8	9.2	32.7	47.5	7.8

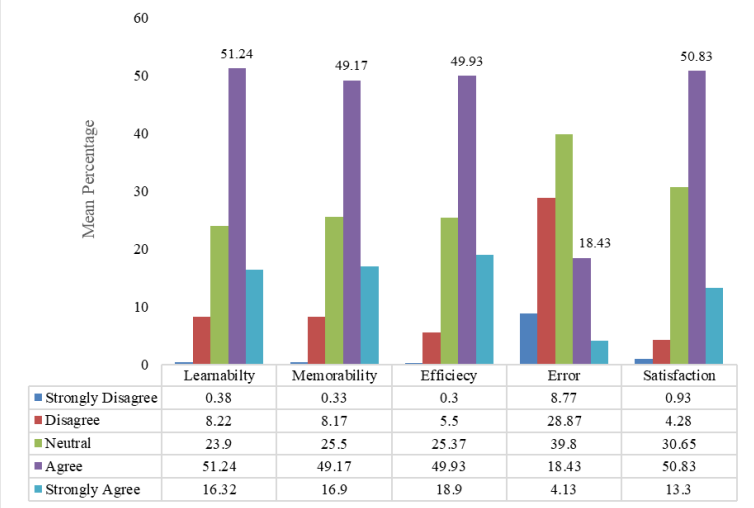

Figure 3. Mean Percentage Usability Evaluation

3.3.1. Learnability

Responses indicate that 67.56 of participants chose options 4 and 5, showing a general agreement that the system is easy to learn. Only 0.38 and 8.22 chose options 1 and 2, respectively, indicating a minority found it challenging.

Table 3. Learnability Indicators

Indicator	Mean	Result
Easy to understand	3,78	Agree
Easy to look for specific information	3,85	Agree
Easy to identify navigational mechanism	3,63	Agree
	3,75	Agree

The respondents provided feedback on various aspects of the design, highlighting their experiences with understanding, finding specific information, and identifying navigational mechanisms. Firstly, respondents agreed that the design is easy to understand, with a mean score of 3.78. This suggests that the overall layout and presentation are intuitive for most users. Secondly, respondents found it relatively easy to find specific information, reflected in a slightly higher mean score of 3.85. This indicates that the design facilitates efficient information retrieval, making it user-friendly for those seeking particular details. Lastly, the ease of identifying navigational mechanisms received a mean score of 3.63. While still positive, this score is slightly lower than the other aspects, suggesting room for improvement in making navigation even more intuitive and accessible.

3.3.2. Memorability

Respondents provided insights into the memorability of the system, focusing on how easy it is to remember and reestablish use after a break (Table 4).

Table 4. Memorability Indicators

Indicator	Result
Easy to Remember	Respondents agree that the system is easy to remember (Mean: 3.71)
Easy to Reestablish	Respondents find it easy to reestablish use after a break (Mean: 3.81)

Firstly, the system received a mean score of 3.71 for being easy to remember. It is indicates that users generally find the system memorable, suggesting that its design and functionality leave a lasting impression, facilitating quick recall. Secondly, when it comes to reestablishing use after a break, the system scored a

mean of 3.81. This higher score reflects that respondents find it relatively easy to pick up where they left off, indicating that the system's usability remains strong even after users have stepped away for a period.

3.3.3. Efficiency

Respondents provided feedback on the efficiency of the system, specifically regarding the ease of quickly finding information and navigating through the system (Table 5).

Table 5. Efficiency Indicators

Indicator	Result
Easy to Reach Quickly	Respondents agree it is easy to find information (Mean: 3.77) quickly
Easy to Navigate	Respondents find the navigation easy (Mean: 3.91)

Firstly, the system received a mean score of 3.77 for being easy to reach information quickly. It indicates that users generally find the system efficient in helping them locate the information they need promptly, which is crucial for maintaining productivity and user satisfaction. Secondly, the navigation aspect of the system received an even higher mean score of 3.91. This score suggests that respondents find the navigation exceptionally user-friendly, allowing them to move through the system quickly and confidently.

3.3.4. Error

Respondents provided feedback on the error aspects of the system, focusing on the presence of errors and the ease of fixing them (Table 6).

Table 6. Error Indicators

Indicator	Result
Number of Errors Detected	Respondents disagree with the presence of errors (Mean: 2.83)
Easy to Fix	Respondents disagree with the difficulty of fixing errors (Mean: 2.75)

Firstly, the system received a mean score of 2.83 regarding the presence of errors. This score indicates that respondents generally do not perceive many errors within the system, suggesting a relatively smooth and reliable user experience. Secondly, the ease of fixing errors received a mean score of 2.75. This score reflects that respondents do not find it particularly difficult to address and rectify errors when they do occur. While the score is low, it still suggests that most users' error-handling process is manageable.

3.3.5. Satisfaction

Respondents provided feedback on their satisfaction with the system, focusing on its pleasantness and comfort (Table 7).

Table 7. Satisfaction Indicators

Indicator	Result
System Pleasant to Use	Respondents agree the system is pleasant to use (Mean: 3.63)
Comfort to Use	Respondents agree the system is comfortable to use (Mean: 3.80)

Firstly, the system received a mean score of 3.63 for being pleasant. This indicates that users enjoy the system, contributing to their overall experience and satisfaction. Secondly, the comfort level of using the system scored a higher mean of 3.80. This score suggests that respondents feel comfortable using the system, implying that the design and functionality contribute to a user-friendly and stress-free interaction.

3.4. Model Refinement

The Model Refinement phase focused on improving the usability and functionality of the e-government financial management system based on the feedback and insights gathered during the Data Analysis phase. This phase involved iteratively adjusting the design and features of the system to address identified issues and enhance the overall user experience. Based on the descriptive statistical analysis and qualitative feedback from users, several key refinements were implemented:

3.4.1. Learnability Enhancements

The refinements to improve learnability primarily focused on simplifying the user experience and making the system more intuitive. We simplified the navigation structure, which allowed users to locate specific information more easily. This change was crucial in reducing the initial learning curve for new users.

To further enhance the onboarding experience, we introduced a comprehensive onboarding process. This process guided new users through the system's features, ensuring they could understand and use it

effectively. Additionally, we incorporated enhanced visual cues, such as tooltips and highlights, to help users quickly grasp the functionality of various interface elements. These visual aids significantly contributed to improving the overall ease of use.

3.4.2. Memorability Improvements

We applied consistent design patterns across the system to aid memory retention and reduce cognitive load. Consistency in design helps users form mental models of the system's structure, making it easier to remember how to navigate and use the system.

We also reinforced frequently used navigation paths with visual aids. By emphasizing these common paths, we made it easier for users to remember how to access the features they use most often. This reinforcement helped users navigate the system more efficiently and created a smoother and more intuitive user experience.

3.4.3. Efficiency Optimization

Efficiency was a key focus area, and we made several optimizations to streamline processes and enhance performance. We identified and streamlined vital processes, reducing the steps required to complete tasks. This optimization significantly improved the system's overall efficiency, enabling users to accomplish tasks more quickly and with less effort. In addition to process streamlining, we implemented technical performance enhancements to reduce loading times and increase system responsiveness. These improvements ensured that users could interact with the system smoothly and without unnecessary delays, further boosting productivity and satisfaction.

3.4.4. Error Reduction

To minimize user errors, we introduced robust error prevention mechanisms. These included input validation features that helped prevent common mistakes before they occurred. By catching errors early, we reduced the likelihood of users encountering frustrating issues.

When errors occurred, we ensured the error messages were clear and informative. The redesigned error messages provided users with specific guidance on resolving issues, making correcting mistakes easier and continuing their tasks with minimal disruption.

3.4.5. Increased User Satisfaction

Enhancing user satisfaction was a top priority, and we achieved this by offering more personalization options and introducing a feedback mechanism (Smith et al., 2021). Users were given the ability to personalize their interface, allowing them to tailor the system to their preferences and work more comfortably. This personalization led to a more enjoyable and satisfying user experience. The feedback mechanism enabled us to continuously gather user input, which was invaluable for ongoing improvements. By listening to user feedback and making iterative enhancements, we ensured that the system remained responsive to user needs and preferences, increasing satisfaction and engagement. These comprehensive enhancements across Learnability, Memorability, efficiency, error reduction, and user satisfaction resulted in a significantly improved e-government financial management system. The refinements addressed the initial usability issues and laid a strong foundation for future improvements, ensuring the system continues to meet the evolving needs of its users. A follow-up survey and usability testing were conducted to measure the impact of these refinements. The results indicated significant improvements across all evaluated aspects.

The usability evaluation of the e-government financial management systems revealed significant improvements across several key areas. Users found the system easier to understand and navigate in terms of learnability, with the mean rating increasing from 3.75 to 4.10. This indicates that users can learn and adapt to the system more efficiently. Memorability also saw notable enhancements. The consistency and reinforcement of navigation paths improved, leading to a rise in the mean rating from 3.74 to 4.05. Users are now better able to remember how to use the system after a period of non-use, reflecting improved design consistency and user experience. Efficiency ratings also improved, with streamlined processes and performance enhancements contributing to an increase from 3.82 to 4.15. Users can now access features and complete tasks more quickly, indicating a more efficient system overall. The occurrence of errors and the ease of resolving them also showed marked improvement. The error rating rose from 2.80 to 3.50, reflecting decreased user-reported issues and enhanced error-handling capabilities. Finally, user satisfaction increased significantly. The mean satisfaction rating climbed from 3.71 to 4.20, indicating that users are overall more pleased with the system's design and functionality. This boost in satisfaction suggests that the system now meets user expectations and business needs more effectively. Overall, these improvements demonstrate the effectiveness of the refinements made to the e-government financial management systems, leading to a better user experience and more excellent system usability.

3.5. Validation

The validity test aims to demonstrate the extent to which a measurement tool can measure what it is intended to measure, specifically data for web usability evaluation research. A measurement tool with high validity will have minimal error, making it reliable that the generated numbers are the actual values. The validity test in this research uses the Product Moment correlation, correlating the item question scores with the total variable scores (Table 8). The parameters for the success of the validity test, which correlates the item question scores with the total variable scores, are based on the KMO (Kaiser-Meyer-Olkin) measure with the following ranges (Kaiser, 1974; Williams et al., 2010). Where 0.8 - 0.9: very good; 0.7 - 0.8: good; 0.6 - 0.7: adequate; 0.5 - 0.6: poor below 0.5: invalid.

Table 8. Validity Test Results

Question	correlation coefficient	Description
Q1	0.886	Valid (Very Good)
Q2	0.858	Valid (Very Good)
Q3	0.880	Valid (Very Good)
Q4	0.889	Valid (Very Good)
Q5	0.836	Valid (Very Good)
Q6	0.913	Valid (Very Good)
Q7	0.907	Valid (Very Good)
Q8	0.836	Valid (Very Good)
Q9	0.931	Valid (Very Good)
Q10	0.915	Valid (Very Good)
Q11	0.887	Valid (Very Good)
Q12	0.730	Valid (Good)
Q13	0.763	Valid (Good)
Q14	0.780	Valid (Good)
Q15	0.828	Valid (Very Good)
Q16	0.870	Valid (Very Good)
Q17	0.787	Valid (Good)
Q18	0.769	Valid (Good)

Overall, the correlation coefficients suggest that participants generally align their responses across various items, with some items showing stronger correlations than others, which is typical in survey data analysis.

4. CONCLUSION

The evaluation of e-government financial management systems in local government institutions in West Sumatra reveals several critical insights into their usability and effectiveness. The study highlights that these systems are generally well-received regarding learnability, memorability, efficiency, and user satisfaction. Users find the systems easy to learn and navigate, capable of facilitating quick access to features and information, and overall satisfactory in terms of design and usability. However, significant challenges remain in the areas of error management and correction. Users frequently encounter difficulties in identifying and rectifying errors, indicating a need for improved error-handling mechanisms and more intuitive guidance. Despite these challenges, the overall positive user feedback on the visual design and comfort of the systems suggests that they hold substantial potential to meet user needs effectively. Refining these systems involves addressing the identified issues through enhanced error detection and correction mechanisms, comprehensive user training, and continuous usability testing to achieve greater efficiency and satisfaction. Engaging stakeholders and users in ongoing development processes will ensure that these systems evolve in alignment with user expectations and technological advancements. Ultimately, these improvements will enhance the efficiency, transparency, and accessibility of e-government financial management systems, contributing to optimized public sector performance and better resource management in the digital age.

This study has several limitations that should be acknowledged. First, the scope of the study was limited to local government institutions in West Sumatra, which may not be representative of other regions or countries. Second, relying on self-reported data through surveys could introduce bias, as participants may not always accurately reflect their experiences or opinions. Third, the study's cross-sectional design captures user experiences at a single point in time, which may not account for changes over time or the impact of ongoing system updates.

Future research should address these limitations by expanding the scope to include a more diverse range of regions and institutions to enhance the generalizability of the findings. Longitudinal studies could provide insights into how user experiences and system usability evolve over time with continued use and updates. Additionally, incorporating a mixed-methods approach, including qualitative interviews and focus groups,

could offer a deeper understanding of user challenges and satisfaction. Finally, exploring the integration of advanced technologies such as artificial intelligence and machine learning in e-government systems could provide innovative solutions for error management and user support, further enhancing system usability and effectiveness.

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