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User Satisfaction Level of Library System Using End User Computing Satisfaction and Importance Performance Analysis Methods

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ABSTRACT

Technological advancements drive digitization across various sectors, including information and public services. Library automation applications, such as *INLISLite* developed by the National Library of Indonesia, facilitate circulation, cataloging, and library management. However, users encounter challenges, including difficulties in printing membership cards and inputting book data. This study aims to analyze user satisfaction with the *INLISLite* application using the *Importance Performance Analysis (IPA)* method based on *End User Computing Satisfaction (EUCS)* variables, along with additional factors such as response speed, attitude toward use, perceived usefulness, perceived enjoyment, and user satisfaction. The research involved 21 librarians and staff from the Disarpus of Banyumas Regency. Results showed a *Customer Satisfaction Index (IKP)* score of 74.25%, indicating moderate user satisfaction. *IPA* analysis via a Cartesian diagram revealed that ease of use *(EOU)* and format (F) variables require priority improvement, while content (C), timeliness (T), response speed (SOR), and perceived usefulness (PU) should be maintained.

INTRODUCTION

The rapid advancement of technology in this era of globalization brings changes that make all activities towards digitalization in terms of the information needs of the community which continues to expand into all fields including library automation [1]. One of the innovations in library system automation is the Integrated Library System (INLISLite) Lite developed by the National Library of the Republic of Indonesia [2]. The use of INLISLite allows library management to be managed more efficiently and reliably, so it can provide benefits in accordance with what is desired [3][4]. The use of INLISLite helps library governance where each component is integrated with each other to help librarians maximize services in the library.

The Banyumas Regency Archives and Library Office (Disarpus) has implemented the INLISLite application since 2012, which stores more than 37 thousand titles or more than 67 copies of library materials. Its responsibility is to assist the Regent in formulating policies, implementing, evaluating, and reporting on government affairs in the field of archives and libraries [5]. Based on interviews with Disarpus managers, several obstacles were identified in the use of the INLISLite application, such as the absence of a suitable template for printing library member cards and the complexity of the book input service due to the number of required forms. Although the application is beneficial for library management, certain aspects still need improvement to optimize the user experience. Therefore, an analysis of user satisfaction based on user needs is necessary. User satisfaction of the INLISLite application is

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considered an important factor in determining the successful implementation of the INLISLite application, because user satisfaction can provide insight into the effectiveness of the system[6].

The success of a system can be seen from the results of measuring user satisfaction. Measurement of user satisfaction can be seen from the presentation of information contained in the system. A system that contains information quickly, accurately, and easy to understand can make users feel satisfied in using the system. Apart from the information side, the aesthetic appearance of the system design also affects user satisfaction. Systems that have a user-friendly design can provide a sense of comfort and provide convenience to users. Measuring the success of a system that focuses on measuring user satisfaction can use the EUCS method by considering the variables of content, accuracy, format, ease of use, and timeliness[7]. This EUCS method is the right approach to measuring user satisfaction with an information system with their experience in using the system[8].

This research will involve a comparison between expectations and the reality they experience during the use of the application. Measuring the comparison value and expectations of system users using the IPA method. In survey research to determine user satisfaction, researchers use the IPA method. The use of the IPA Method to be able to find out the variables that are prioritized for improving the INSLISLite application. Data processing in the IPA Method has two stages, namely suitability level analysis and quadrant analysis. Conformity level analysis is used to compare the score of the level of service performance, provided by the operator as a service provider. While quadrant analysis is carried out by comparing the score of the performance level, with the score of the level of importance for service users in knowing the order of priority in order to improve the quality of performance indicators measured [9]. By this method, researchers will get an overview of which indicators need to be improved and maintained. The use of this method will later produce an analysis of the suitability and gap between the reality and expectations of system users [1].

This research is based on previous research wherein measuring the level of user satisfaction of the DANA and OVO applications using the IPA method and User Experience Questionnaire resulted in a suitability value of 96.6% on DANA and 92.8% on OVO [10]. Further research in measuring the level of user satisfaction with the Covid-19 M-Health application. Using the EUCS method, this study shows that user satisfaction is only significantly influenced by the variables of content, ease of use, and timeliness and the variables of efficiency, system availability, information content, compensation, and service content. In this study, it focuses more on assessing user perceptions of service quality on the system using the M-S-Qual method, while the current study uses the EUCS method [11].

Other studies discuss variables that affect user satisfaction, including research by [12] [13]. Speed of response states that speed of response is one of the factors that can increase user satisfaction. Besides, research by [14] states that the perceived usefulness that users feel when using the system can provide benefits for user and will affect the sense of satisfaction of system users. Other research by [15] states perceived enjoyment when using a system not only encourages them to use it more often but also provides satisfaction for users. Further research [16][17] states that the attitude of users towards the system used can also affect user satisfaction and increase the intention to continue using the system and provide a sense of satisfaction for its users.

However, previous research has not focused on the library system (INLISLite). This study also uses other variables outside the EUCS method based on the results of previous studies, such as speed of response, attitude towards use, perceived usefulness, and perceived enjoyment. It is interesting to examine how the level of user satisfaction with the INLISLite library system is based on the EUCS method and additional variables such as speed of response, attitude towards use, perceived usefulness, and perceived enjoyment. The purpose of this study was to determine the level of user satisfaction of the INLISLite library management system in Banyumas Regency based on variables in the EUCS method and variables of speed of response,

attitude towards use, perceived usefulness, and perceived enjoyment, and using the IPA method to analyze variables that are the top priority for improvement in the INLISLite application.

METHODS

This research began with problem identification, namely analyzing the obstacles in using INLISLite at the Banyumas Regency Disarpus, and found obstacles during the process of printing member cards and inputting books. Furthermore, data collection was carried out through observation, interviews, and questionnaires to understand user experience. The measurement scale used was a Likert scale of 1-5. To measure the level of user satisfaction using the EUCS method approach and adding variables such as speed of response, perceived usefulness, perceived enjoyment, and attitude toward use [18][13].

Meanwhile, to identify necessary improvements, the IPA method is applied, which compares expectations and system performance [19]. The use of the EUCS and IPA methods has an interest in analyzing user satisfaction from the point of view of the variables contained in the EUCS method, then the IPA method is used to analyze the variables in the EUCS method that need to be improved by looking at the quadrant position. The distribution of questionnaires was given to all librarians and employees of the Banyumas Regency Disarpus, totaling 21 people. The data collected was processed using SPSS, then tested with validity and reliability tests used to ensure the quality of data and research instruments, then processed using descriptive analysis, and mapped in a Cartesian diagram to identify aspects that need to be improved or maintained in INLISLite [20].

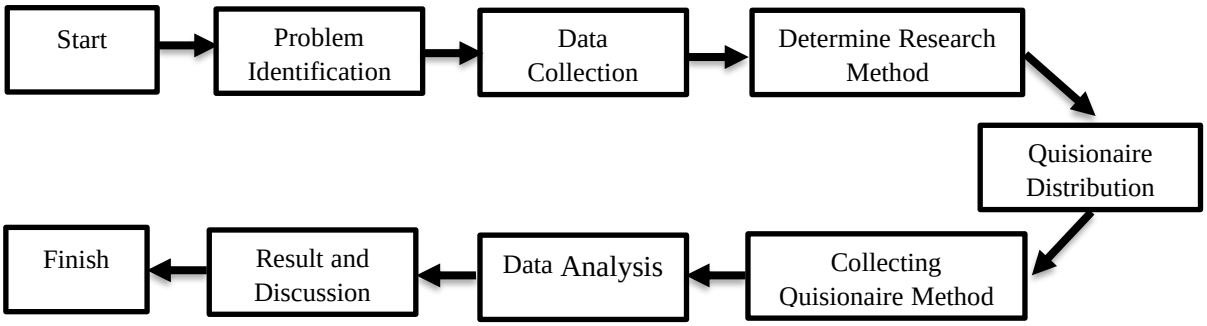


Figure 1. Research Concept

Data Collection

Data collection is carried out to collect data as research material, and observations are made to find out the various features and functions of the INLISLite application directly at the Banyumas Regency Disarpus. Furthermore, interviews were conducted by researchers to obtain data from the agency in the form of problems felt by users of the INLISLite application. The interview was conducted with the Disarpus Electronic Library Manager. As a resource person, this was done using the interview method, namely by the researcher asking questions of the resource person and the resource person then providing answers. Other data collection with questionnaires to find out the performance and expectations of library system users.

Determining the Research Method

The EUCS method is used as the main approach in measuring user satisfaction of the INLISLite application. This method assesses five main aspects that affect user experience: first, the Content variable, which assesses the suitability of the information provided by the application to user needs. Second, accuracy in measuring the accuracy of information and data generated by the system. Third, format, which evaluates the appearance of the user interface and the format of the report presentation. Fourth, ease of use, namely assessing the ease of use of the application. Fifth, timeliness, which measures the speed of the system in presenting the information needed.

In addition to the main aspects, this study also added several additional variables that contribute to user satisfaction such as speed of response to measure the speed of the system in

responding to user commands [12]. Next is perceived usefulness to measure the real benefits that the application provides to users [13]. Perceived Enjoyment to assess the user's experience in enjoying the use of the application [15][21], and Attitude Toward Use in assessing the user's attitude towards the application, both in terms of acceptance and continued use [22][23].

The IPA method is used to analyze the level of importance and performance of features in the INLISLite application. This method helps identify aspects that need to be maintained or improved so that the application is more optimal in meeting user expectations. The stages in the IPA method are first determining the factors to be analyzed; second collecting data on respondents' answers in the form of performance levels (performance) and levels of importance or expectations (importance), calculating the average performance and importance; and fourth making a Cartesian diagram.

IPA analysis produces mapping in a Cartesian diagram consisting of four quadrants, namely Quadrant I (Top Priority) describes variables with factors that are very important but have low performance, so they need to be improved immediately. Quadrant II (Maintain Achievement), namely variables with factors that have high importance and their performance, is satisfactory. Quadrant III (Low Priority) is a variable that has factors with low importance and performance so it does not need to be the main focus. Quadrant IV (Excessive), namely several variables that have factors with high performance but lack a significant impact on users [19][20]. The IPA graph can be depicted in the form of a Cartesian diagram, which is divided into four quadrants divided by the X-axis and Y-axis. The X-axis indicates the average score of variable performance, while the Y-axis indicates the average score of user expectation variables [24][25].

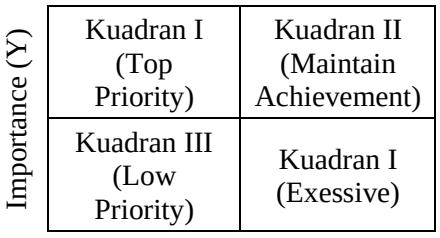


Figure 2. Diagram Kartesius

Validity and Reliability Test

The validity test is carried out to determine the feasibility of the question items in defining the variables using the Pearson product moment correlation formula, while the reliability test is carried out to measure the consistency of the questionnaire, which has indicators of the variables. Based on the Cronbach's Alpha value, the instrument reliability measurement indicators are in table 1. [26].

Table 1. Criteria for Reliability

Cronbach Alpha Value	Criteria for Reliability
0,81 - 1,00	Very high
0,61 - 0,80	High
0,41 - 0,60	Medium
0,21 - 0,40	Low
Less than 0.20	Very low (not reliable)

IPA

IPA analysis is carried out after testing the validity and reliability of the questionnaire instrument. Analysis is used as a depiction of the level of gaps that exist in applications such as knowing the gap or gap value between the level of performance and the level of importance or expectation of each user satisfaction variable based on the EUCS method. The stages in the IPA

method begin with determining the level of conformity between the level of performance and the level of importance or expectation.

The suitability level analysis is carried out to determine the comparison between the application performance score, and the application interest score where the results of this analysis indicate whether the INLISLite application is in accordance with user expectations or not. For the suitability level criteria, if the score ≥100% is declared good or in accordance with user expectations, but if <100%, it means that the application is not in accordance with the interests/ expectations of the user. To find out the level of conformity between application performance and application interests, namely by dividing the average value of performance by the average value of interests, which is then multiplied by 100%.

RESULT AND DISCUSSION

Result

Respondent Characteristics

The number of respondents was 21 employees with characteristics based on gender, class, age, and education. Based on gender found in Fig 3. there are 9 (42.9%) men and 12 (57.1%) women. Based on class found in Fig 4. there are 11 (52.4%) civil servants and 10 (47.6%) non-civil servants.

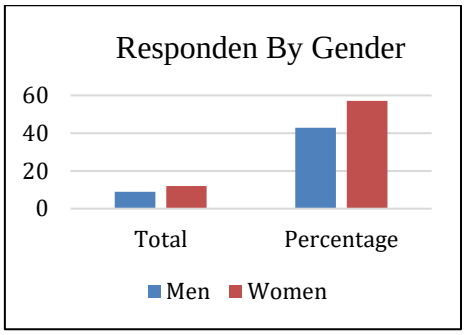


Figure 3. Respondents By Gender

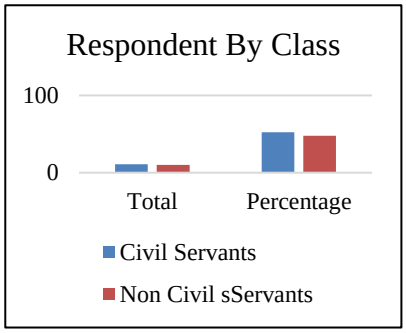


Figure 4. Respondents By Class

Based on age found in Fig 5. age 18-25 a total of 6 (28.6%), age 26-37 a total of 8 (38.1%), age 38-45 a total of 3 (14.3%), and age 46-57 a total of 4 (19%). Based on the latest education found in Fig 6. there were 3 (14.3%) high school students, 8 (38.1%) diploma students, and 10 (47.6%) bachelor's degree students.

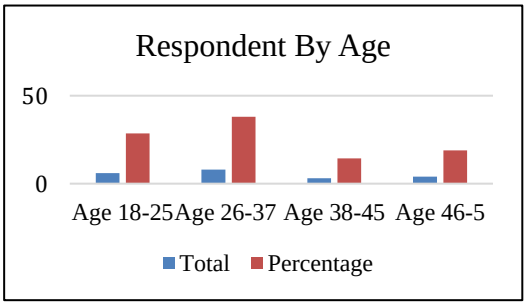


Figure 5. Respondents By Age

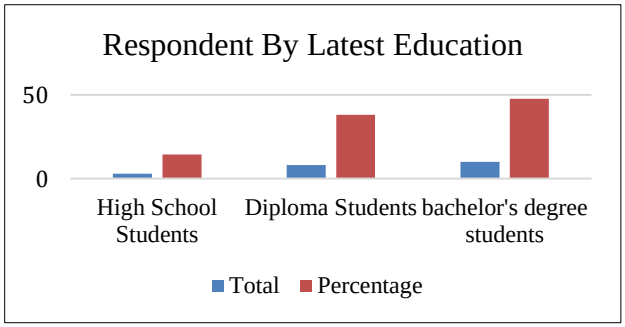


Figure 6. Respondents By Latest Education

Validity Test

The validity test results are declared valid if the rCount value is greater than rTable. In this study, the significance level determined was 0.05 or 5%. Meanwhile, the rTable value was obtained at 0.433 with 21 research respondents or df = 19. After analyzing the data, it was found that all questions obtained the rTable value, the results of the validity test of this research questionnaire in Table 2.

Table 2. Uji Validitas

Question Code	*r*-Count	*r*-Table
C1	0,909	0,433
C2	0,866	0,433
C3	0,928	0,433
C4	0,862	0,433
ACC1	0,894	0,433
ACC2	0,915	0,433
ACC3	0,904	0,433
ACC4	0,807	0,433
F1	0,891	0,433
F2	0,929	0,433
F3	0,949	0,433
F4	0,946	0,433
EOU1	0,914	0,433
EOU2	0,927	0,433
EOU3	0,949	0,433
EOU4	0,939	0,433
T1	0,943	0,433
T2	0,954	0,433
T3	0,882	0,433
SOR1	0,889	0,433
SOR2	0,951	0,433
SOR3	0,893	0,433
SOR4	0,814	0,433
ATT1	0,965	0,433
ATT2	0,955	0,433
ATT3	0,963	0,433
PU1	0,977	0,433
PU2	0,920	0,433
PU3	0,964	0,433
PU4	0,981	0,433
PU5	0,983	0,433
PE1	0,949	0,433
PE2	0,834	0,433
PE3	0,923	0,433
PE4	0,908	0,433
US1	0,947	0,433
US2	0,960	0,433
US3	0,947	0,433
US4	0,981	0,433

Reliability Test

The reliability test is a continuation of the validity test which serves to determine the consistency of a measuring instrument. In Table 3. is the result of the reliability test which shows the results of Cronbach's Alpha worth more than 0.90, it can be concluded that all questions have very high reliability.

Table 3. Reliability Test

Variables	Cronbach's Alpha	Description
Content	0,912	Very high reliability
Accuracy	0,903	Very high reliability
Format	0,945	Very high reliability
Ease of use	0,948	Very high reliability
Timeliness	0,918	Very high reliability
Speed of response	0,906	Very high reliability
Attitude toward use	0,950	Very high reliability
Perceived usefulness	0,981	Very high reliability
Perceived enjoyment	0,916	Very high reliability
User satisfaction	0,971	Very high reliability

IPA

After analyzing the data with validity and reliability tests, the next process is to analyze using the IPA method. The IPA analysis method has two, which include suitability level analysis and quadrant analysis. Table 4 shows is the result of the IPA analysis, where at the initial stage the average score will be calculated for each variable based on the level of performance and based on the level of importance of the application system. The results of the average calculation will then be processed in calculating the level of conformity analysis by dividing the average value of performance by the average value of importance multiplied by 100%, as in the Tki% column. Table 4 shows the conducting of a quadrant analysis where, in a Cartesian diagram, the variables will occupy their quadrants according to the results based on the level of performance and importance.

Table 4. IPA Analysis Results

Variables	Average		Tki%	Quadrant	I x P	∑ I x 5
	Performance	Importance				
Content	3,80	4,30	88,37%	IV	65,29	
Accuracy	3,69	4,29	86,20%	III	63,22	
Format	3,69	4,40	83,81%	I	65,09	
Ease of Use	3,62	4,46	81,09%	I	64,68	
Timeliness	3,75	4,30	87,12%	IV	48,33	
Speed of Response	3,77	4,46	84,57%	II	67,41	847,15
Attitude Toward Use	3,70	4,24	87,29%	III	47,02	
Perceived Uselfulness	3,89	4,34	89,53%	II	84,38	
Perceived Enjoyment	3,52	4,30	81,98%	III	60,63	
User Satisfaction	3,65	4,31	84,90%	III	62,98	
			85,49%		**629,02**	

Conformance Level Analysis

From the results of the suitability analysis contained in the Tki% column, it can be explained that the variable with a high level of suitability is the Perceived Usefulness variable with a suitability value of 89.53%. Meanwhile, the variable with the lowest suitability value is the Ease of Use variable with a value of only 81.09%. Overall, the results of the IPA calculation show that the total level of conformity of application performance to user expectations is 85.49%, which has met user expectations, while the unmet ones are 14.51%.

Quadrant Analysis

Then, the IPA analysis using the scatter graph on SPSS for Windows version 26, where the performance value with the expected value is mapped into four quadrants. Namely quadrant I, quadrant II, quadrant III, and quadrant IV, which are bounded by the x-axis, which indicates the average total score of the performance level, and the y-axis, which indicates the average total score of the importance level.

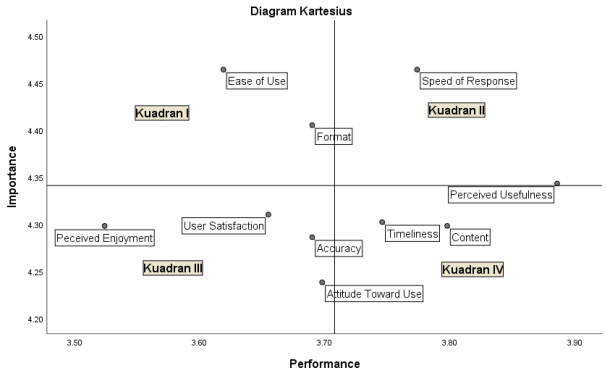


Figure 7. IPA Analysis Diagram Results

The results of the quadrant analysis in Fig 7. in each quadrant can be explained as follows:

1. Content
   In this study, content is in quadrant IV, so it can be explained that the INLISLite application has complete and easy-to-understand information, including the number of book collections, library members, and borrowing status. Despite having high performance, this aspect is considered less important by users because less important information dominates the homepage of the application.
2. Accuracy
   In this study, accuracy is in quadrant III. So it can be explained that the INLISLite Application has many menus and features, but the layout and placement between menus are still somewhat irregular, so data synchronization between menus cannot produce accurate data optimally.
3. Format
   In this study, the format is in quadrant I. It can be explained that the format variable in the INLISLite application needs to be improved, the reason it is in quadrant I is because users assess the INLISLite application as having a poor design with a mismatched color arrangement. In addition, the menu structure in the INLISLite application is less organized so that the impact on users feels like difficulty in accessing between menus and features.
4. Ease of Use
   In this study, ease of use is in quadrant I. It can be explained that the Ease of Use variable in the INLISLite application needs to be improved, the reason it is in quadrant I is because the INLISLite application has just been implemented at the Regional Archives and Library Service so that all employees need to take part in training to understand each function in each menu and feature, but the large number of and features that must be filled in when inputting books in the INLISLite application has an impact on employees who find it difficult during the book data input process.
5. Timeliness
   In this study, timeliness is in quadrant IV, it can be explained that the INLISLite application responds quickly and on time in displaying information. The INLISLite application always updates book data, visit data, and other information to meet user needs, such as collection data that is being borrowed and book data that has been returned.
6. Speed of Response
   In this study, the speed of response is in quadrant II. So it can be explained that the INLISLite Application processes services quickly and responsively, including making member cards, filling out guest books, and handling obstacles, thus providing a simple and efficient experience for users.

7. Attitude Toward Use
   In this study, attitude toward use is in quadrant III, so it can be explained that the performance of the INLISLite application is still not optimal, so that it has an impact on the low level of user pleasure and enthusiasm in using it for library automation. As in the feature to add book data, because the number of forms that must be filled in makes users feel less happy. In addition, applications that can only be accessed using the intranet only make users feel less satisfied with the INLISLite application.
8. Perceived Usefulness
   In this study, perceived usefulness is in quadrant IV, it can be explained that the INLISLite Application provides convenience in various aspects of library management and services. Users who feel helped in the process of finding books in the library quickly. For librarians, the INLISlite application helps in data collection of books and data collection of library members in a complete and organized manner.
9. Perceived Enjoyment
   In this study, perceived enjoyment is in quadrant III. It can be explained that INLISLite application users feel that using the application is less enjoyable because the large number of menus that are not neatly structured makes users feel less enjoyment in using the application.
10. User Satisfaction
    Applications that are less user-friendly cause the level of user satisfaction to not be high. Unattractive application design, lack of ease in the process of inputting books, and applications that cannot be accessed online.

User Satisfaction Index

Table 5 shows the data of the user satisfaction index. The score of the criteria satisfaction index, is a value that describes the level of satisfaction received by users [27].

Table 5. User Satisfaction Index Criteria

Value	Satisfaction Criteria
0 - 50%	Not Satisfied
51% - 80%	Quite Satisfied
81%-100%	Satisfied

Based on the I x P column in Table 4. then the User Satisfaction Index (IKP) value can be obtained with the equation 1:

$$IKP = \frac{\sum(I\ x\ P)}{\sum I\ x\ 5} \text{ x } 100\ \%$$

$$IKP = \frac{629{,}02}{847{,}15} \text{ x } 100\ \% \ = 74,\ 25\ \%$$

Based on the calculation results, the IKP value is 74.25%, where the value is based on equation 1. Users are considered to be quite satisfied with the INLISLite application. With this value, the application can be made improvements and performance improvements to the application in order to increase satisfaction with application users.

From the results of the IKP value, it can be interpreted that users feel that the performance of the INLISLite application is sufficient for user satisfaction. The performance of the INLISLite application that can respond quickly to commands from users is one of the factors in the level of satisfaction of application users. The ease of the book data collection process, member data collection, and the library circulation process in the application eases the librarian's work. Book data information that is always updated makes it easier for users to find the information they need. So that the application gives a sense of satisfaction to its users

Discussion

The results of this study indicate that the level of user satisfaction with the INLISLite application is in the moderately satisfied category with a IKP value of 74.25%. These results show that although INLISLite has provided significant benefits to users, there are still important aspects that need to be improved, especially on the ease of use and format variables that are included in Quadrant I (top priority for improvement) in the IPA analysis. When compared with previous research by [8], which evaluated user satisfaction of digital training applications using the EUCS and IPA methods, it was found that the IKP achieved in the satisfied category was higher than the results of this study. This suggests that in the context of a simpler and more focused training application, the user interface and user experience can be more easily optimized compared to a library system such as INLISLite, which has higher functional complexity.

In a study by [10] comparing the DANA and OVO applications using the IPA and User Experience Questionnaire methods, the level of agreement was 96.6% and 92.8%, respectively. This high value can be attributed to the orientation of both applications to end users in the context of highly competitive digital financial services that demand highly intuitive and responsive information presentation and interface design. Compared to INLISLite, which still requires training for new users and shows weaknesses in interface structure, especially in the book data input process. Research by [11] on the M-Health application also shows that not all EUCS variables have a significant effect on user satisfaction, content, ease of use, and timeliness variables that make an important contribution to user satisfaction. This is consistent with the findings in this study, where ease of use is one of the variables with the lowest suitability score (81.09%), indicating the need for special attention to aspects of ease of use of the application.

The results of this study are reinforced by findings in the literature that additional variables such as speed of response [12], perceived usefulness [14] and perceived enjoyment [15] have a significant influence on user satisfaction. In this study, perceived usefulness is in Quadrant II (should be maintained), indicating that users feel the application provides real benefits in their work, although the design and user experience are not yet optimal. However, some variables such as attitude toward use and perceived enjoyment are in Quadrant III (low priority), indicating that although users find the app useful, they do not necessarily enjoyable or have a positive attitude toward its use. This suggests that emotional factors and long-term perceptions of the system need to be improved.

CONCLUSIONS

The results of the study can conclude that the user satisfaction level is 74.25%. This value indicates that INLISLite application users are quite satisfied with the performance of the INLISLite application. The use of the IPA method in this study results in the ease of use and format variables falling into Quadrant I or those that must be improved for their performance. While the variables of perceived usefulness and speed of response fall into Quadrant II, where the variables must be maintained. For the accuracy variable, attitude toward use, perceived enjoyment, and user satisfaction enter into Quadrant III, which has a low priority level for improvement, and for the content and timeliness variables, they enter into Quadrant 4, where the performance of these variables is very high and needs to be maintained. These results show the importance of UI/UX design in improving ease of use in the INSLISLite digital library system. Recommendations to Disarpus to be able to make improvements to the appearance design and use of colors in the system interface, in addition to structuring menus and features so that they are easily understood quickly by users. This research is limited to one area, for further research, it can use more areas so that more samples are used. Besides that, it can conduct research on factors that affect user satisfaction with library systems.

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