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User Satisfaction Analysis of HIS (Hospital Information System) Application at dr Cipto Mangunkusumo National Hospital

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A B S T R A C T

dr Cipto Mangunkusumo National Hospital is one of the academic hospitals that has organized electronic-based medical records. The application used is named HIS (Hospital Information System). In the implementation, there are supporting modules directly related to research activities, namely research RME access management in the HIS application. Regulation Number 24 of 2022 concerning Medical Records explains that one of the requirements for opening electronic-based medical records is for interest. With an adequate module in the HIS application, an evaluation must be carried out to see whether the existing features are following what users expect. There still need to be features related to data withdrawal for research needs. However, it can be concluded that user satisfaction is sufficient for the RME access management module in supporting the implementation of good electronic medical records.

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INTRODUCTION

Hospitals are healthcare institutions that organize comprehensive individual health services that provide inpatient, outpatient, and emergency services (Indonesian Ministry of Health, 2018). The services provided must be based on the quality of health services in the hospital. The quality of health services in hospitals is data or information from good and complete medical records. One of the quality indicators in the organization of hospitals is the organization of medical records (Nusa et al., 2019). Medical records are documents containing data on patient identity, examination, treatment, actions, and other services that have been provided to patients where in their current development, it has been organized based on electronics (Indonesian Ministry of Health, 2022). The development of electronic medical records is already contained in Minister of Health Regulation No. 24 of 2022, where all healthcare facilities are required to implement a maximum of 2023.

The lending of electronic medical records has been stated in Minister of Health Regulation No. 24 of 2022, which explains that the opening of the contents of medical records is not with the patient's consent only for the benefit of one of their education and research. Facilities that support the opening of electronic medical records for research purposes in the HIS application are in the form of an RME access management module.

Dr Cipto Mangunkusumo National Hospital is one of the healthcare facilities that pioneered the implementation of electronic medical records in Indonesia. The application used is called HIS (Hospital Information System). In addition, as a teaching hospital, RSUP Nasional Dr Cipto Mangunkusumo has also facilitated electronic medical records following the application flow. In particular, electronic medical records have been provided with a module to process electronic medical record loans to support research and education activities. The module is in the research RME access management module in the HIS application.

Based on the initial study conducted by the researcher, it was found that so far, the supporting facilities in the form of the RME access management module for research activities have never been evaluated regarding the suitability of the flow with the features available in it. Users also feel the inefficiency of the RME access management module because they still use additional tools in the form of Google forms to fill out requests for borrowing electronic medical records. In addition, there still needs to be features supporting the research RME access management module. So, this shows that an evaluation of the existing system is necessary, especially in the RME access management module. System evaluation is required to identify an application's strengths and weaknesses (Nursyanti & Erlangga, 2013). Other studies also mention the importance of system evaluation to identify the strengths and weaknesses of an application that is being used, knowing whether or not the information is available when needed and knowing that the information provided in the application is presented accurately, reliably, and precisely and to determine user satisfaction with the use (Khoirun Nissa et al., 2020). In this study, researchers

evaluated the RME access management module using the EUCS method. The EUCS method is a method used to measure user satisfaction with an information system implementation [6]. In addition, the EUCS method is suitable for evaluating a system regarding user satisfaction. This study analysed user satisfaction with the research RME access management module in the HIS application at Dr Cipto Mangunkusumo National Hospital

THEORETICAL REVIEW

The End User Computing Satisfaction (EUCS) model was developed by Doll & Torkzadeh, (1998) to measure user satisfaction with the computer systems they use. This model consists of five main dimensions: content, accuracy, format, ease of use, and timeliness. Content assesses whether the system's features and information meet the users' needs. Accuracy measures how well the system processes data and produces correct information. Format looks at the display and presentation of information—whether it is neat, clear, and easy to read. Ease of use refers to how easily users can operate the system, including entering and searching for data. Meanwhile, timeliness evaluates how quickly the system provides information, especially when it is needed in real-time. These five dimensions help to understand the extent of user satisfaction with the system and serve as a guide for improving information system quality.

METHODOLOGY

Type of Research

This type of research is qualitative research, with the research method used is the EUCS (End-User Computing Satisfaction) method. User satisfaction will be identified based on the dimensions of the EUCS method. These dimensions include content, accuracy, format, ease of use and timeliness (Alfiansyah et al., 2020). The research was conducted from February 2023 to April 2023. The research was conducted at Dr Cipto Mangunkusumo National Hospital.

Research Subjects

The subjects in this study were officers of the Medical Records and Admissions Installation (IRMA) as users of medical records and responsible for requesting and borrowing medical records for research purposes, totalling four officers.

Data Source

Primary data in this study are the results of interviews and observations related to user satisfaction with the research RME access management module in the HIS application.

Data Collection Methods

Data collection methods used interviews, observation and documentation. In-depth interviews and observations were conducted to identify and analyse content, accuracy, appearance, user-friendliness and timeliness related to user

satisfaction in the research RME access management module. In comparison, documentation is used to support supporting data from the results of observations made in the study.

RESULTS AND DISCUSSION

User Satisfaction with the Research RME Access Management Module Based on the Content Dimension

The content dimension measures user satisfaction based on system content. System content usually consists of functions and modules that system users can use and information obtained by the system (Rachmawati & Krisbiantoro, 2021). In this study, the content dimension is described in several indicators in the form of information, completeness, benefits and outputs. Initially, the researchers identified the content of the research RME access management module, which was adjusted to the current medical record lending flow. Based on the interview results, the information provided by the research RME access management module is appropriate. It's just that there are still frequent human errors by the applicant (researcher) which result in denial of access by the officer because it can cause insecurity or misuse. The following is the informant's statement: "*the information contained in the RME access management feature follows the request in the form of approving RME access requests for research purposes, research request hours, applicants and others. If the researcher fills in an unclear reason, the RME opening request is rejected for fear of being misused and the security is not guaranteed*." (Informants 1,2,3)

In line with previous research by (Dianta et al., 2019), which states that human error influences the security of an information system (Ava Dianta et al., 2019). Furthermore, regarding the completeness of features in the research RME access management module, there still needs to be a discrepancy where RME access requests for retrospective research purposes are still included in the non-research features, which should be included in the research features.

Figure 1 Retrospective Research

The mismatch in Figure 1 will reduce the optimization of the research RME access management module in helping officers serve RME access openings to researchers. The following is a reinforcing statement from the informant: "*for now, it is complete, but there are still shortcomings that need to be developed; namely, in the*

retrospective research section, it must be changed so that it enters the research menu because, for now, it is still included in the non-research menu" (Informants 1,3,4).

The completeness of information system features does influence user satisfaction according to statements in previous research (Utama, 2020), where the study also explains that features that are complete, following user expectations, provide benefits in applying them will provide satisfaction to its users (Utama, 2020). The results of research related to benefit indicators show that the benefits felt by users in operating the research RME access management module can help complete the process of requesting RME loans for research purposes, where initially the loan was still manual and went through a long flow, now it is more efficient because it only needs to approve loan requests through the RME access management module in the HIS application. The following is the strengthening of the interview results by the informant: "*the benefits in the research RME access management feature is following what we need, where the information contained is complete such as the date of request, the response time for receiving access to open RME for research reasons*" (Informants 1,2,3,4). This is in line with research (Angga et al., 2017), which states that the indicator of usefulness is the key to the successful application of information technology, which is described by the level of end-user acceptance of the system as user benefits (Angga et al., 2017). Research (Mudiono et al., 2018) also states that the success of application performance can help system users' performance, which means that user satisfaction increases if the system is successfully implemented and used in their daily lives (Mudiono et al., 2018).

Furthermore, from the output dimension, no user dissatisfaction was found because the research RME access management module has provided the output needed by officers. The following is the informant's statement: "*the output obtained from the research RME access management feature is related to requests for each day, the applicant, and the date of the request, which is already in one download in the upper left corner. It's already appropriate*" (Informants 1, 2,4).
"*for needs related to data withdrawal, there is no feature yet*" (Informant 3).

The informant's statement and the results of the output indicator research are in line with research (Rakhmadian et al., 2017), which states that the quality of output is in the form of information produced by the information system used if the output is sound then the quality of information of an information system will be good too, and users will feel satisfied (Rakhmadian et al., 2017). This follows Doll and Torkzadeh's theory which states that the content in an information system must follow user needs, and the suitability of the content in the information system with the resulting output is critical because the content there is a data input or data processing whose results will be reported in an information presentation (Doll & Torkzadeh, 1998). So, it can be concluded from the content dimension that causes user dissatisfaction lies in the indicators of information and completeness.

User Satisfaction with the Research RME Access Management Module Based on the Accuracy Dimension

The accuracy dimension measures user satisfaction regarding data accuracy when the system receives input and processes it into information, and the accuracy dimension measures user satisfaction based on data accuracy [8]. In this study, the accuracy dimension is described through the accuracy indicator. The results of research conducted through interviews found that all data in the RME access management feature was accurate because of the restrictions on access rights in using the RME access management module in the HIS application. The following is the informant's statement:

"In terms of data accuracy, it must be accurate, especially since only medical record users can access RME access management" (Informants 1,2,3,4).

The observation results also show that the RME access management module can only be accessed by access rights with the user as a medical record.

Figure 2 Access Rights RME Access Management Module

Figure 2 shows in the upper right corner if a user with group access rights as a medical record can access the RME access management module. So, strictness can increase user satisfaction if access rights restrictions are adjusted to the main tasks and functions. According to Doll and Torkzadeh, checking whether a system has a good level of accuracy can be seen from the number of errors generated when processing data (Doll & Torkzadeh, 1998). And in this study, users were satisfied with the accuracy of the research RME access management module.

User Satisfaction with the Research RME Access Management Module Based on the Format Dimension

This research describes the display dimension as a quality design in supporting users to use the application and make decisions with the application [14]. This dimension is defined through the indicators of the appearance itself and colour. The results of his research show that the appearance and colour in the research RME access management module are apparent and related to the functions in this feature and are considered precise so that it can facilitate users. The interface design in the research RME access management module is attractive and does not mind the appearance or colour. The following is an interview statement from the informant:

"*it is good and makes it easy to display*" (Informants 1,4)

"*it is following the needs and elementary tools*" (Informant 2)

"*the appearance is quite satisfying because it makes it easy for users and is also attractive*" (Informant 3)

"*In terms of colour, it's okay because Umsi also knows and has been adjusted to the existing provisions*" (Informants 1,2,3,4).

Meanwhile, from the observations made, the RME access management module is indeed following the needs of its users.

Figure 3 Waiting for Approval Menu Research RME Access Management Feature

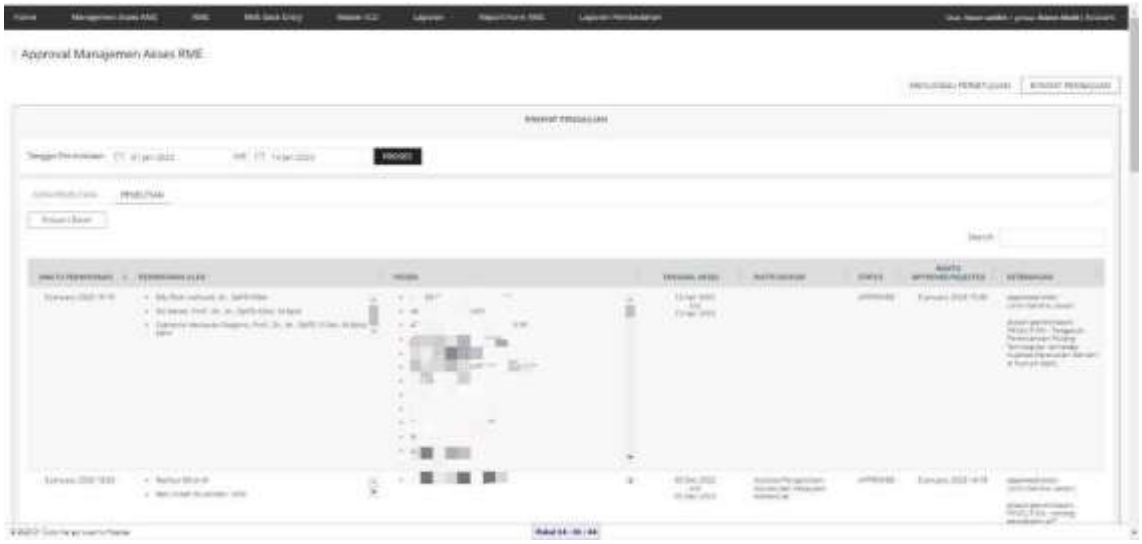

Figure 4 Submission History Menu Research RME Access Management Feature

Figures 3 and 4 are the interfaces of the research RME access management module, which consists of the 'waiting for approval' and 'submission history' features. Previous research by (Agung et al., 2015) also aligns with the study's results. It explains that user satisfaction in terms of appearance can be seen from whether or not a system is attractive, where the system can make it easier for users to use the system (Agung & Wisudiawan, 2015). According to Doll and Torkzadeh, an attractive appearance (format) and ease of understanding and using the interface can increase end-user satisfaction and affect user effectiveness (Doll & Torkzadeh, 1998). So, from the display dimension, users are satisfied with

the appearance and colour provided in the research RME access management module.

User Satisfaction with the Research RME Access Management Module Based on the Ease of Use Dimension

The ease of use dimension measures user satisfaction according to the usability or user-friendliness when using the system, such as inputting data, processing data, and searching for the required information (Rachmawati & Krisbiantoro, 2021). In this study, the user convenience dimension is described by user-friendliness, service system and efficiency indicators. The research results of the user-friendly indicator show that the research RME access management feature has made it easier for officers when granting access request rights to researchers to view the RME. The following is his statement:

"*in terms of user convenience, it is very okay, deck, so we use this access management in our daily activities, especially since the tools given are easy and simple*" (Informant 1,2,3,4).

In line with other research by (Syahrulla et al., 2016), user convenience is satisfied if the application can process data, search for information and enter data as needed (Syahrullah et al., 2016). The results of the service system indicator research found that the service system provided by the vendor as the HIS application developer has provided an application usage manual; there are also video tutorials on how to use the HIS application. And also, the vendor directly provides socialization to installation representatives if new features are added to the HIS application. However, on the other hand, the distribution of this information has yet to be conveyed to all officers. Excerpts of interviews with informants are as follows:

"*There is an instruction manual, a video tutorial, and socialization*" (Informants 2,3).

"*As far as I know, there are video tutorials, and UMSI usually comes here to give explanations*" (Informant 1).

"*There is socialization, but I have never seen the instruction manual*" (Informant 4).

Regarding the video tutorial for using the RME access management module, it does exist, and researchers got it when observing the UMSI section; the following are the documentation results.

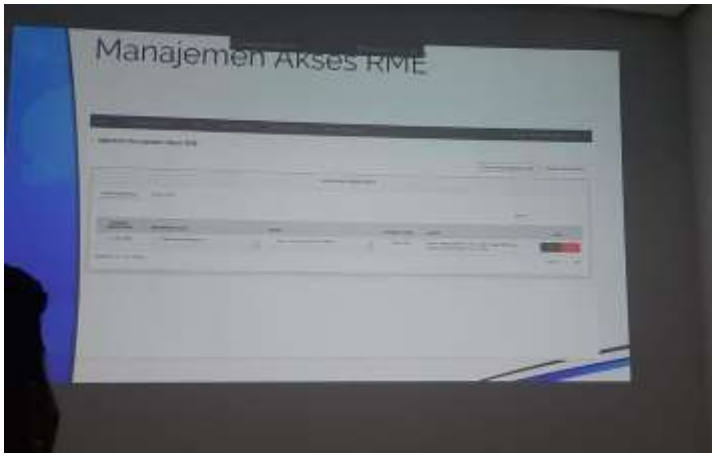

Figure 5 Video Tutorial for Using the RME Access Management Module

Meanwhile, efficiency can be interpreted as the speed of working on "tasks" in an application (Istianah & Yustanti, 2022). The results of the efficiency indicator research showed that users were satisfied because the research RME access management module helped speed up services related to borrowing electronic medical record files. Previously, 100% of medical record loans were manual-based, now more and more medical records are electronic so that borrowing for research purposes can also be accessed through the HIS application in the RME access management module without having to borrow and see the contents of medical records to the Medical Records and Admissions Installation (IRMA) of Dr Cipto Mangunkusumo National Hospital. The following is the informant's interview statement:
"*it is more efficient to use the RME access management feature because the services provided can also be faster than the provision of medical record loans which are still manual*" (Informants 1,2,3,4).

Based on the dimension of user convenience, the cause of user satisfaction is system efficiency, where if the system can facilitate the work of officers, the system's function is successful. If users choose to use and make decisions with the system, users are satisfied. According to Doll and Torkzadeh, the ease of using the system includes the entire process from start to finish, which consists of entering data, processing and searching for information and displaying the final data used by end users (Doll & Torkzadeh, 1998). It can be concluded those users are satisfied based on the user-friendliness dimension of the research RME access management module.

User Satisfaction with the Research RME Access Management Module Based on the Timeliness Dimension

The timeliness dimension measures user satisfaction according to the system's timeliness in displaying or providing the data and information users need (Doll & Torkzadeh, 1998). This study reviews the timeliness dimension from indicators of call time reliability and up-to-date. The research results of the time reliability indicator show that the service time provided by the research RME access management feature is speedy. And the observations also show that only two periods of downtime occurred in the HIS application, so on those two days, the acceptance of access to requests to open the RME for research purposes was pending. The following is the informant's reinforcing statement:
"*downtime rarely occurs; even if it happens, it won't take a day later; the approval can also be done again with only 2-5 minutes*" (Informant 1,2,3,4).

In line with previous research (Syahrullah et al., 2016), which explains that timeliness in a system is essential in information; the faster the output produced by a system, the better user satisfaction will be achieved (Syahrullah et al., 2016). Furthermore, the renewal indicator obtained research results through experienced menu updates tailored to user needs. One of the latest forms of an update is the addition of request status, approved/rejected time and a description of the medical record officer who approved. This is in line with a

study that states that information updates in a system significantly increase user satisfaction [18]. The following is a statement from the informant:

"There are often updates in RME access management, especially when there is a request from us, the features are immediately added even though there is no specific notification, but we have experienced several updates to the information in the menu" (Informant 1,3).

Figure 6 Last Update of RME Access Management Module

Figure 6 shows the last update to the RME access management module in the HIS application. It can be concluded from the dimension of timeliness that causes user satisfaction is the reliability of time. The faster application response time facilitates the services provided to the community to increase user satisfaction in using the RME access management module. Research (Alfiansyah et al., 2020) is in line with the results of research that explains this following Hakam's theory that the existence of an information system will significantly assist officers in presenting information quickly and precisely, and the information presented can be used for decision making to improve service quality (Hakam, 2016).

CONCLUSIONS AND RECOMMENDATIONS

User satisfaction with the research RME access management module can be considered entirely satisfactory, seen from accuracy, format, ease of use and timeliness. Meanwhile, users feel less satisfied, as seen from the content dimension, because there still needs to be more features in the RME access management module. From the researchers also providing suggestions, it is hoped that there will be additional features in the research access management module in the form of retrospective research features. And it is expected that the Medical Records and Admissions Installation (IRMA) can make a flow of borrowing electronic medical records for research purposes to make it easier to develop features in the research RME access management module in the future.

FURTHER STUDY

This study has provided an overview of user satisfaction with the RME access management module in the HIS application at Dr. Cipto Mangunkusumo National Hospital based on the five EUCS dimensions. However, for future development, it is recommended that subsequent studies involve a larger number of respondents, including external researchers, doctors, and other medical personnel who also use the HIS system for research purposes. Future research may also adopt a quantitative or mixed-methods approach to generate more generalizable data. Additionally, incorporating other evaluation models such as the Technology Acceptance Model (TAM) or the DeLone and McLean IS Success Model could offer different perspectives on the factors influencing satisfaction and system acceptance. Finally, further exploration of additional feature requirements particularly those related to research data extraction and integration between hospital information systems is necessary to enhance the overall functionality and efficiency of the HIS application.

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