EVALUATING USER SATISFACTION AND EFFICIENCY OF E-REPORT SYSTEMS IN VOCATIONAL SCHOOLS: A PIECES FRAMEWORK ANALYSIS FROM TEACHER PERSPECTIVES

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ABSTRACT

This study aims to evaluate the user satisfaction and efficiency of E-Rapor system by qualitative approach with PIECES framework on SMK Negeri 1 Kupang. The study focuses on uncovering the ice in the E-Rapor system. The research aims to identify strengths and areas for improvement in the system. Findings indicate that while the E-Rapor system significantly streamlines the process of student assessment and reporting, some performance issues, such as system slowdowns during peak usage, require optimization. Teachers typically feel that the system is easy to use, processes data quickly and is accurate. Nonetheless, changes in report structures and improvements in data protection such as the deployment of tougher encryptions or regular audits are needed. It is further recommend that technological support services be refined to serve user needs more effectively. The study findings suggest that while the system has had an overall positive effect on student learning, further revisions will be necessary for consistent use and optimal user satisfaction, ultimately informing clear guidance for future improvements throughthe PIECES framework..

Keywords : *E-Rapor, User Satisfaction, System Efficiency, PIECES Framework, Vocational High School, Information System Evaluation*

I. INTRODUCTION

The rapid growth of information and communication technology (ICT) has made a significant contribution to different sectors, especially in education. Educational institutions increasingly rely on digital platforms to manage and disseminate information, with the aim of increasing the efficiency and effectiveness of the educational process. As an example, the existence of E-Rapor, which facilitate digitalization when dealing with data on student grade. E-Rapor system aims to help in recording, analyzing and reporting a student's grade with clear advantages when comparing it against traditional paper-based which tends to be more accuracy by adding accessibility and efficiency (Lase et al., 2023).

However, the implementation of E-Rapor at SMK Negeri 1 Kupang does not absolve from any problems. Similar to numerous other technical innovations, the success of this system

largely relies on user adoption and satisfaction– such as for teachers and students. In practice, systems that are considered complicated or inefficient can create resistance among users, which ultimately hinders their effectiveness . At SMK Negeri 1 Kupang, several teachers and students reported difficulties in operating this system, which caused delays in data input and report processing. In addition, these problems not only affected operational efficiency, but also impacted the overall perception of the system and motivation to use it consistently.

Furthermore, technical issues such as lack of adequate training for users, limited internet access, and limited technical support are often major obstacles in implementing E-Rapor. These conditions exacerbate resistance to the new system and result in suboptimal use of the system. Teachers who are accustomed to manual systems may find it difficult to adapt to new technology, while students may feel less supported if there is no clear guidance on how they should access and use E-Rapor for their academic interests.

To evaluate the effectiveness of E-Rapor implementation at SMK Negeri 1 Kupang, this study uses the PIECES (Performance, Information, Economics, Control, Efficiency, and Service) framework. PIECES framework if used to assess different perspectives of the system gives an insight about where improvements are required (Fatoni et al., 2020). This study is expected to identify the strengths and weaknesses of E-Rapor system through an analysis, Then it will be able recommend ways to improve user satisfaction as well efficiency of systems.

This study is directed at answers to the following research questions:

1. How satisfied are users (teachers) with the E-Rapor system implemented at SMK Negeri 1 Kupang?
2. How efficient is the E-Rapor system in managing and reporting student performance data?
3. What aspects of the E-Rapor system need improvement to increase user satisfaction and system efficiency?

Through providing answers to these questions, this study has the goal of contributing to the ongoing discussion on the implementation of digital educational tools in vocational schools, providing practical insights that can be used to develop a more effective and user-friendly system. The results of this study are anticipated to contribute further information for education policymakers, school administrators and educational technology developers in enhancing the success rate of E-Rapor system that will lead improving vocational quality.

II. LITERATURE REVIEW

A. Implementation of E-Rapor in Education.

The application of the electronic raport (E-Rapor) has increasingly become one of real innovations in the field namely modernization and digitalisation school administration processess. E-Rapor is an electronic assistant that greatly assists teachers in the management and publication of student grades through a web-based platform (Kemdikbud, 2022). The set of advantages provided by this system include improved accuracy in data, reduced chance of

error from human interaction and students/parents have a convenient point to access (Lase et al., 2023).

A study by Jaffar and Sabandi (2019) the implementation of E-Raport in vocational high schools can improve assessment and reporting efficiency. Nevertheless, this implementation is also confronted with several obstacles such as the limited availability of technology infrastructure; inadequate training for users and teacher who have been in their practices using conventional methods. Jaffar and Sabandi (2019) claim that the successful implementation of E-Raport, also underlined that it is highly determined by school management support and continuous training for teachers. Some of the challenges such implementation face are inadequate technological capacity, poor user training and teachers resistance to change due to their years in practice with manual ways (Lase et al., 2023).

B. User Satisfaction in Information System Implementation.

User satisfaction is a key element in determining the success of information system implementation, including in the context of education. This satisfaction is closely related to how users, both teachers and students, assess the system based on their experience during use. According to Delone and McLean (2003), the information system success model includes six main dimensions such as system quality, information quality, service quality, usage, user satisfaction, and net benefit impact. User satisfaction is one of the six main dimensions in a model presented by Delone and McLean (2003) which suggest that system quality, information quality as well as service quality directly influence user satisfaction.

In this regard, user satisfaction with E-Rapor is strongly influenced by the ease of use (usability) and system reliability. Easy-to-use system will enable teachers and students to quickly go through E-Rapor features with minimum frustration, increasing productivity (Fatoni et al., 2020). In addition, system reliability is also an important factor; a system that often experiences disruptions or is slow in processing data will cause dissatisfaction and resistance from users.

Park (2009) in his research on technology acceptance in education found that perceived usefulness and ease of use are the main predictors of user intention to continue using new technology. This also applies in the context of E-Rapor, where users who feel that the system facilitates the administration process and improves the accuracy of assessments tend to be more satisfied and more likely to accept and adopt the system on an ongoing basis.

Having plenty of technical support is also very important to a high satisfaction rate just as much as usability. Technical support will include initial training for teachers and students on how to use the program, user friendly guides and quick help when issues with technology arise. Without adequate support, even a well-designed system can face user resistance due to their inability to optimally utilize all system features (Delone & McLean, 2003).

User satisfaction is also influenced by how the system is tailored to the specific needs of users. Systems that are designed with local needs in mind and provide flexibility in customization will usually get better acceptance among users (Fatoni et al., 2020). In the case

of E-Rapor, if the system is able to adapt to the local curriculum and school administration needs, users will be more satisfied because the system is considered relevant and useful.

C. Efficiency of Information Systems in Education

One of the key dimensions to evaluate information systems is efficiency, which indicates how efficiently and effectively we are using available resources in order for the system achieve its goals. In the educational sector, a good information system should be able to store, process data quickly and accurately so it must easily accessible by users and support integration with other systems that school uses.

E-Rapor effectiveness can be viewed from time aspects in the processing of data and presentation, speed accessibility is fast enough; responsiveness that occurs when used for a large number of concurrent users does not decrease performance. A well-organized system will not only help to save time and energy, but it also supports the teacher's productivity in controlling administration (Whitten & Bentley, 2007).

The availability of technological infrastructure in schools is another factor that impacts efficiency. A school with good infrastructure like internet connection and proper hardwares will be more efficient in using E-Rapor. In contrast, poor infrastructure can block system introduction and operational delays in processing data which leads to efficiency loss.

D. PIECES Framework in Information System Evaluation

The PIECES (Performance, Information, Economics, Control, Efficiency, and Service) framework is a comprehensive evaluation tool used to assess various aspects of an information system. This framework covers six main dimensions (Fatoni et al., 2020):

1. Performance.
   Measures how well the system functions in terms of data processing speed and accuracy.
2. Information.
   Assesses the quality of information produced by the system, including its accuracy, completeness, and relevance.
3. Economics.
   Evaluates the costs associated with implementing and maintaining the system, as well as the efficiency of resource use.
4. Control.
   Ensures that the system has adequate mechanisms for access control and data security.
5. Efficiency.
   Measures how well the system utilizes resources to achieve its intended purpose.
6. Service.
   Assesses the quality of services provided by the system, including technical support and user satisfaction.

According to Fatoni et al. (2020), the use of PIECES framework in evaluating information systems allows to identify accurately which part that needs improvement so as lead specific strategic steps and efforts to upgrade its quality or effectiveness. For the E-Rapor

environment, PIECES-based evaluation can help schools reveal strengths and weaknesses of the system which would help to analyze how well (or bad) parts work together in relation to their overall performance or user satisfaction. By evaluating E-Rapor using the PIECES framework, schools can ensure that the system not only functions efficiently but also meets user needs and supports overall educational goals.

III. METHODOLOGY

1. Research Design

This study uses a qualitative descriptive approach with the aim of exploring and describing the implementation of E-Rapor at SMK Negeri 1 Kupang. This design was chosen because it allows researchers to gain an in-depth understanding of the experiences, perceptions, and challenges faced by teachers in using the E-Rapor system. The qualitative approach is also suitable for identifying factors that influence user satisfaction and system efficiency, as well as evaluating information systems using the PIECES framework.

2. Research Location and Participants.

The study was conducted at SMK Negeri 1 Kupang, a vocational high school that has implemented E-Rapor as part of their educational administration system. The population in this study included all homeroom teachers at SMK Negeri 1 Kupang, totaling 62 teachers. However, the sample used in this study was 20 homeroom teachers of class XI, who were selected through cluster random sampling techniques. The selection of this sample was based on their involvement in the assessment and reporting process using E-Rapor.

3. Data Collection Techniques

The data in this study were collected through the following techniques:

a) In-depth Interviews

Semi-structured interviews were conducted with teachers to explore their experiences in using E-Rapor. These interviews aimed to understand user satisfaction, challenges faced, and their perceptions of the efficiency and reliability of the system. Each interview lasted for 30-45 minutes and was recorded with the participants' permission for further analysis.

b) Participant Observation

The researcher also observed the use of E-Rapor in schools. Observations were made during the data input process by teachers. This observation allowed the researcher to

identify technical problems that emerged, as well as observe user interactions with the system directly.

c) Documentation

The researcher collected related documents such as E-Rapor usage guidelines, implementation report results, and school policies related to the use of this system. These documents were analyzed to obtain additional information that supported the findings from the interviews and observations.

4. Use of the PIECES Framework

The PIECES (Performance, Information, Economics, Control, Efficiency, and Service) framework is used in this study as an evaluation tool to assess various aspects of the implementation of E-Rapor at SMK Negeri 1 Kupang. PIECES was chosen because this framework provides a comprehensive approach to evaluating the performance and effectiveness of information systems.

a) Performance.

The evaluation of system performance includes an analysis of the speed and accuracy of data processing by E-Rapor, as well as how well this system supports the assessment and reporting process.

b) Information.

The information aspect is evaluated by looking at the quality of data generated by E-Rapor, including the accuracy, completeness, and relevance of the information presented to teachers and students.

c) Economics.

The economic evaluation assesses the cost efficiency associated with the implementation and maintenance of E-Rapor, as well as its impact on the allocation of school resources.

d) Control.

The control aspect includes an analysis of the access control mechanisms and data security implemented in E-Rapor to protect sensitive student information.

e) Efficiency.

System efficiency is evaluated by assessing how well E-Rapor utilizes available resources to achieve desired goals, such as ease of access and speed of data processing.

f) Service.

Service evaluation includes an assessment of technical support provided to users, including training, guidance, and responses to technical problems faced by teachers and students.

Each dimension in the PIECES framework will be analyzed based on data collected from interviews, observations, and documentation. The results of this analysis will be used to identify the strengths and weaknesses of E-Rapor, as well as provide recommendations for improvements to improve performance and user satisfaction.

5. Data Analysis Techniques

Data obtained from interviews, observations, and documentation were analyzed using thematic analysis techniques. The analysis process was carried out through the following steps:

a) Transcription.
   Interviews that had been recorded were transcribed verbatim to ensure that all information conveyed by participants was well documented.
b) Coding.
   Transcribed data were coded to identify the main themes that emerged. Coding was done manually by marking text segments that were relevant to the research objectives.
c) Theme Identification.
   Themes that emerged from the coding process were then grouped based on their similarities and relevance. These themes include factors that influence user satisfaction, challenges in using E-Rapor, and aspects that influence system efficiency.
d) Interpretation.
   The identified themes were interpreted to provide an in-depth understanding of how E-Rapor was implemented at SMK Negeri 1 Kupang and its impact on users. This interpretation also includes a system evaluation using the PIECES framework to assess the performance, efficiency, and services provided by the system.

6.Validity and Reliability

To ensure the validity and reliability of the data, the researcher implemented the following strategies:

a) Data Triangulation
   The researcher used several data sources (interviews, observations, and documentation) to verify the findings and ensure that the research results accurately depict reality.

b) Member Checking

The results of the interview transcripts and initial interpretations were reconfirmed with participants to ensure that the researcher's interpretations were in accordance with the participants' experiences and perceptions.

c) Peer Debriefing

The researcher involved colleagues to review the coding process and data interpretation, so that bias could be identified and the analysis was carried out objectively.

IV. RESULTS

1. Performance of E-Rapor at SMK Negeri 1 Kupang

The results of the study indicate that the performance of the E-Rapor system at SMK Negeri 1 Kupang is generally considered adequate by most teachers who participated in this study. Teachers reported that the system is quite fast in processing student grade data and producing the required reports. However, several teachers expressed technical constraints, such as the system being slow when used simultaneously by many users, especially when collecting end-of-semester grades.

2. Information Generated by E-Rapor

The quality of information generated by E-Rapor was considered good by teachers. This system is able to present student grade data accurately and easily accessed. Teachers felt that the information presented by E-Rapor helped them evaluate student performance more comprehensively. However, several teachers noted the need for adjustments to the report format to better suit the needs of school administration, such as the addition of special notes or more detailed descriptive assessments.

3. E-Rapor Efficiency in the Assessment and Reporting Process

The efficiency of the E-Rapor system was evaluated based on ease of access, speed of data processing, and its impact on the time spent by teachers in the assessment and reporting process. The results showed that E-Rapor significantly reduced the time needed for teachers to complete administrative tasks related to assessment. Before the implementation of E-Rapor, teachers often needed days to complete the final assessment, whereas with E-Rapor, this process could be completed in a shorter time. However, the efficiency of the system was sometimes disrupted by technical problems that slowed down the process.

4. Control and Data Security in E-Rapor

The aspects of control and data security in E-Rapor were also of concern in this study. Teachers generally felt that this system was equipped with adequate access control features,

such as the use of passwords and access restrictions based on user roles (admin, teacher, student). However, some concerns arose regarding the security of student data, especially in the event of data leakage or unauthorized access by outside parties. Several teachers suggested that schools improve system security through stronger data encryption and periodic audits of user access.

5. Service and Technical Support for E-Rapor

The results of the study also show that the quality of service and technical support provided by the E-Rapor development team at SMK Negeri 1 Kupang still needs to be improved. Although teachers received initial training before using the system, many of them felt that the technical support currently available was inadequate, especially when facing complex technical problems. Teachers expect an improvement in the technical team's response to the problems they face, as well as the availability of more comprehensive guides or tutorials.

6. User Satisfaction with E-Rapor (Economic Aspect)

Overall, the level of user satisfaction with E-Rapor is quite high, although there are several aspects that need improvement. The teachers involved in this study appreciated the benefits of E-Rapor in accelerating and simplifying the assessment process. They also stated that this system is efficient in terms of the time and resources required for assessment and reporting. However, this economic aspect remains closely related to the improvements needed in system stability, report format, and technical support. This level of satisfaction shows that although E-Rapor has made a positive contribution, there is still room for further development so that this system can function optimally and meet the needs of all users.

V. DISCUSSION

1. User Satisfaction with the E-Rapor System

The results of the study indicate that the level of user satisfaction, consisting of teachers at SMK Negeri 1 Kupang, is generally positive. Most teachers feel that E-Rapor has helped them simplify the process of assessing and reporting student grades. The speed of the system in processing data and producing the required reports is also considered adequate, although there are some complaints related to the slowness of the system when used simultaneously by many users.

This user satisfaction is influenced by several factors in the PIECES framework, especially in the dimensions of Service and Performance. The quality of service provided by the system, especially in terms of technical support, is still considered inadequate by users. Although initial training has been provided, ongoing support when facing technical problems is still not optimal, which has an impact on user satisfaction. Other studies also support the importance of adequate technical support to improve user satisfaction in the implementation of information systems in education (Thanh et al., 2024).

The fairly good performance of the system under normal conditions also contributes to the high level of satisfaction. Teachers felt the benefits of the system making their work easier,

although system stability still needs to be improved to cope with higher workloads. Research by Petter et al. (2008) emphasized that stable and reliable system performance is a key factor in ensuring user satisfaction.

2. Efficiency of the E-Rapor System in Managing and Reporting Student Performance Data

Efficiency is an important dimension in the PIECES framework that is directly related to the system's ability to manage and process data quickly and accurately. The results of the study showed that E-Rapor at SMK Negeri 1 Kupang was considered quite efficient by teachers. This system has succeeded in reducing the time needed to complete administrative assessment tasks, which previously took longer when done manually. This efficiency also reduces the workload of teachers, so they can focus on other teaching tasks.

However, this efficiency is still constrained by technical problems such as slow systems during peak usage. According to Whitten and Bentley (2007), the efficiency of an information system depends not only on the design of the system itself, but also on supporting infrastructure such as server capacity and internet speed. This is also confirmed by research from Garrison et al. (2010) which shows that strong infrastructure is very important to support system efficiency in an educational environment.

3. Aspects That Need Improvement to Increase User Satisfaction and System Efficiency

The results of this study also identified several aspects in the PIECES framework that need improvement:

a. Performance.
   Although the E-Rapor system is able to process data quickly under normal conditions, system performance becomes slow when many users access it simultaneously. Increasing server capacity and optimizing the system to handle higher workloads is needed to overcome this problem. Research by Alshawi et al. (2011) supports the importance of performance optimization to ensure that the information system can function well even under high workload pressure.
b. Information.
   The quality of information produced by E-Rapor is considered good, but there is a need to adjust the report format to better suit the needs of school administration. The addition of features for special notes or more detailed descriptive assessments would greatly assist teachers in providing more meaningful evaluations of student performance (Delone & McLean, 2003).
c. Economics.
   The economic aspect in the evaluation of E-Rapor includes cost efficiency associated with the implementation and maintenance of the system. Although this system saves teachers' time and energy, schools need to ensure that the investment in technology infrastructure is commensurate with the benefits obtained. This is in line with the findings of research by Iacovou et al. (1995) which shows that cost efficiency is an important factor in the successful adoption of information technology.
d. Control.

The control and data security aspects also require attention. Although the system has been equipped with adequate access control features, concerns regarding the security of student data indicate the need for further improvements, such as the implementation of stronger encryption and periodic security audits (Fatoni et al. (2020). Research by D'Arcy and Hovav (2009) highlights the importance of strong security controls to protect sensitive data in educational information systems.

e. Service.

The quality of service and technical support still needs to be improved. Teachers expect an improvement in the technical team's response to the problems they face, as well as the availability of more comprehensive guides or tutorials. This is very important to maintain a high level of user satisfaction and ensure that they can use the system effectively (Park, 2009). Research by Berry et al. (1988) also shows that responsive and quality service is an important element in ensuring customer satisfaction in the context of information technology.

By improving all of these aspects, the E-Rapor system can better meet user needs and improve operational efficiency at SMK Negeri 1 Kupang. These improvements are also expected to increase user satisfaction, which will ultimately support wider adoption and use of this system in the future.

VI. CONCLUSION

The E-Rapor system is a breakthrough in the education field, so this study focused on user satisfaction and effectiveness of the implementation E-Rapor at SMK Negeri 1 Kupang using PIECES Framework. Results of the study suggest that applying E-Rapor system results in a significant enhancement for evaluating student grades and generating student reports. Overall, teachers are happy with the system and feel it is relatively simple to use, efficient in processing data quickly and pretty accurate in the information that gets produced. Nevertheless the PIECES framework evaluation pointed out much space for improvement. In terms of performance, the system still experiences obstacles, especially when used by many users simultaneously, so that capacity enhancement and system optimization are needed to ensure stable performance. While characteristics of the information are quite high, tweaking the report format somewhat would make it more useful for school administration by including slots for special notes or qualitative assessments.

This system has been shown to be effective in decreasing assessment and reporting time, but it can provide additional improvement if the performance of the system itself is expedited, mostly during peak times. The control and data security aspects of the system also need to be improved, especially in terms of implementing stronger encryption and more regular security audits to protect student data. In addition, the cost efficiency associated with the implementation and maintenance of the system must be commensurate with the benefits obtained, so that investment in technological infrastructure can support the efficiency of the system as a whole. Technical support and user services also need to be improved, with a focus on faster response and the availability of more comprehensive guidance to assist teachers in

overcoming technical problems. In general, although E-Rapor has made a positive contribution in the teaching and learning process at SMK Negeri 1 Kupang there is still room for improvement. The system can increase overall satisfaction by doing a better job of meeting user needs through performance, control, efficiency and service improvements. The evaluation conducted using the PIECES framework provides clear guidance for improvement steps that can be taken in the future.

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