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Analysis of e-puskesmas satisfaction level using pieces framework at belimbing public health center padang

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ABSTRACT

To determine the extent of the impact of the E-Puskesmas application on the business processes at Bellimbing public health center Padang, an analysis of the existing system is necessary. The analysis of the E-Puskesmas application is conducted using the PIECES framework. The PIECES framework is a method used to identify and analyze critical aspects that can affect the utilization of a system or application, consisting of Performance, Information, Economy, Control, Efficiency, Security, and Service. This method is employed in various contexts, including information system development, evaluation of existing systems, and business process improvement. This research is conducted quantitatively by distributing questionnaires to E-Puskesmas users. The results of the analysis of the E-Puskesmas application's usage across the six PIECES parameters indicate that, on average, users are satisfied with the application that has been in use for over a year at Belimbing public health center.

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1. INTRODUCTION

The most crucial aspect of achieving excellence in health information system management is to perform an analysis and understand the key factors that influence system performance. One of the methods used to gain an in-depth understanding of these factors is by utilizing the PIECES framework (Performance, Information, Economy, Control, Efficiency, and Service). This method has proven to be an effective tool for identifying, measuring, and comprehending to what extent health information service systems, such as E-Puskesmas impact the performance and effectiveness of healthcare facilities like public health center.

In a previous study (Putra, 2018), titled " Analysis of the Implementation of the E-Puskesmas System Using the PIECES Method at the Pemancungan Padang Health Center 2018" it was found that the use of E-Puskesmas was generally good, although there were still some challenges, such as unstable internet connections leading to suboptimal application performance. Additionally, the security of E-Puskesmas access, which employs shared username and password accounts, was identified as a serious

issue that needs immediate attention. One of the main concerns regarding information security is human error resulting from inappropriate behavior (Humaidi, 2013).

(Leonard dkk., 2018) conducted research using the same method, and the results showed that the performance aspect can expedite data entry and reduce service response time. In terms of information, the E-Puskesmas system is limited to generating "Laporan Bulanan 1 (LB1)", which is a monthly report of the most common diseases (Sukawan & Nadia, 2018). Regarding the economic aspect, the implementation of E-Puskesmas still requires manual recording and reporting activities. Control aspects show that the implementation of E-Puskesmas lacks data security control. The efficiency aspect indicates that the use of E-Puskesmas still results in duplicated work. Regarding service, the E-Puskesmas menu does not fully meet user needs, and there are limitations in reporting menu options. This study also identified security control issues where, in practice, the system can be accessed by all healthcare personnel, and even one public health can access the login credentials of another, despite the system should have access restrictions based on job assignments (Permana dkk., 2023) and require authentication (Jang dkk., 2017) according to the authority of the healthcare personnel.

In another journal article (Tarigan & Maksum, 2022) titled " Pemanfaatan layanan sistem informasi E-Puskesmas dengan menggunakan metode PIECES," the results showed that the performance (51.7%), information (55.2%), and service (55.2%) aspects were categorized as good, while the economics (51.7%), control (72.4%), and efficiency (55.2%) aspects were categorized as less than good.

In addition to PIECES, there are several models that can be used to analyze and evaluate the utilization of existing information systems. One of these models is the Technology Acceptance Model (TAM), as employed in research by (Wijaya, 2020), (Irawati dkk., 2020), and (Adi & Permana, 2018). Then, there is also the Human Organization Technology-Fit (HOT-Fit) model, as studied by (Erlirianto dkk., 2015), (Ayuardini & Ridwan, 2019), (Sala & Subriadi, 2023), and (Febrita dkk., 2021).

The PIECES framework is also used in various studies, including evaluating online examination information systems (Freshtiya Beby Larasati dkk., 2021), analyzing market performance (Ula dkk., 2021), assessing user satisfaction with library information systems (Lokapitasari Belluano dkk., 2019), evaluating the M-BCA application (Prayogi dkk., 2021), and evaluating hospital management information systems (Alfiansyah dkk., 2022).

E-Puskesmas is a crucial application for managing healthcare service data in public health because the future of public health is likely to become increasingly digital (Budd dkk., 2020). The importance of this technology as a necessary tool (Smaradottir dkk., 2016) in decision-making and health data monitoring processes, making it an integral component of public health services. However, to assess how well the application meets user expectations and provides the desired benefits, a comprehensive analysis of the current system is required.

This study using the PIECES framework focuses on analyzing user satisfaction levels (Fatoni dkk., 2020) with E-Puskesmas at Belimbing public health center in Padang, by utilizing the PIECES framework, which covers performance, information, economy, control, efficiency, and service (Hartati dkk., 2022). The goals of this approach is to gain a better understanding of the extent to which E-Puskesmas aligns with user expectations and to identify areas that require improvement.

This research employs a quantitative approach by distributing questionnaires (Ramadhani, 2018) to E-Puskesmas users at Belimbing public health center. The findings from this research are expected to provide valuable insights for enhancing the utilization of E-Puskesmas and serve as a guide for other public healthcare institutions looking to maximize the benefits of similar healthcare information service systems.

2. RESEARCH METHOD

The research conducted is of a descriptive analysis nature using a qualitative approach. Descriptive analysis is a research method employed to create a portrayal or description of the state of an object with the primary objective of correcting or improving existing systems (Al Fatta, 2007). The measurement scale used to assess respondents' agreement with statements in the questionnaire is the Likert scale (Kristy & Kusuma, 2018). The Likert scale is the most straightforward scale to use (Budiaji, 2013) as it is a research scale used to gauge attitudes and opinions. This scale is used to complement questionnaires that require respondents to indicate their level of agreement with a series of questions. The levels of agreement referred to are on the Likert scale, which offers choices ranging from Strongly Agree (SA) to Strongly Disagree (SD) (Sampoerna University, 2022), and these gradations can be seen in Table 1.

Table 1. Likert Scale

Answer	Score
Strongly agree	5
Agree	4
Doubtful	3
Don't agree	2
Strongly Disagree	1

To assess the level of user satisfaction with the utilization of E-Puskemas, an evaluation is employed, as illustrated in Table 2 below (Hikmatulloh dkk., 2022):

Table 2. Assessment Characteristics

Value Range	Level of Satisfaction
1,00 – 1,79	Very Dissatisfied
1,80 – 2,59	Not satisfied
2,60 – 3,39	Quite satisfied
3,40 – 4,19	Satisfied
4,2 – 5,00	Very satisfied

The population of this study comprises all healthcare workers employed at Belimbing health centers who use E-Puskesmas. The research sample was selected using a total sampling technique (Tarigan & Maksum, 2022), which equaled the total population size, resulting in a total of 30 respondents. Subsequently, it is recapitulated and calculated using the Likert scale with the following formula (Kristy & Kusuma, 2018):

$$AS = \frac{TQS}{TQ} \qquad (1)$$

Where:
AS = Average average satisfaction
TQS = Total Questionnaire Score
TQ = Total of Questionnaire

3. RESULTS AND DISCUSSIONS

Based on the questionnaire that has been answered by the respondents regarding E-Puskesmas, the validity results are as follows:

Table 3. Validity Test

Number of Question	Domain	Criteria
6	Performance	Valid
5	Information and Data	Valid
3	Economic	Valid

5	Control and Security	Valid
2	Efficiency	Valid
4	Service	Valid

Next, an assessment of the characteristics of each variable within the PIECES framework is carried out. Subsequently, the computation results of the questionnaire regarding the level of satisfaction of end-users with the E-Puskesmas application are explained. The computation and data interpretation results for the Performance domain encompass 6 questions related to E-Puskesmas. The calculation results for each item are shown in Table 4.

Tabel 4. Domain Performance

Answer Options	Frekw	Total Score
Strongly agree	45	225
Agree	126	504
Doubtful	5	15
Don't agree	4	8
Strongly Disagree	0	0
Total	180	752

Referring to the calculation of the average score for the Performance variable, a score of 4.18 is obtained, and according to Table 2, it falls within the 'satisfied' range. This indicates a positive signal that users are already 'satisfied' with the performance of E-Puskesmas. Furthermore, the calculation results and data processing for the Information and Data variable encompass 5 questions related to E-Puskesmas. The calculation results for each questionnaire item are shown in Table 5.

Tabel 5. Domain Information and Data

Answer Options	Frekw	Total Score
Strongly agree	35	175
Agree	91	364
Doubtful	3	9
Don't agree	19	38
Strongly Disagree	2	2
Total	150	588

Referring to the calculated average value for the Information and Data variable, a score of 3.92 is obtained, and based on Table 2, the assessment characteristic falls within the 'satisfied' category. This is a positive indication that end-users are 'satisfied' with the information and data generated by E-Puskesmas. Furthermore, the calculation results and data processing for the Economic variable, which includes 3 questions related to the E-Puskesmas system, can be seen in the Table 6.

Tabel 6. Domain Economic

Answer Options	Frekw	Total Score
Strongly agree	15	75
Agree	56	224
Doubtful	14	42
Don't agree	4	8
Strongly Disagree	1	1
Total	90	350

Referring to the calculated average value for the Economic variable, a score of 3.89 is obtained, and according to Table 2, it falls within the 'satisfied' range. The interpretation of this value is positive, indicating that end-users are already 'satisfied' with the economic implications of the E-Puskesmas application. Next, in the calculation results and data processing for the Control and Security variable, which comprises 5

questions related to E-Puskesmas, the calculation outputs for each question can be seen in the Table 7.

Tabel 7. Domain Control and Security

Answer Options	Frekw	Total Score
Strongly agree	21	105
Agree	101	404
Doubtful	14	42
Don't agree	9	18
Strongly Disagree	5	5
Total	150	574

Based on the calculation of the average score for the Control & Security variable, a score of 3.83 is obtained, and referring to Table 2, it falls within the 'satisfied' range, demonstrating a positive signal that end-users are 'satisfied' with the security and supervision when using E-Puskesmas. The calculation results and data processing for the Efficiency variable, which includes 2 questions related to E-Puskesmas, and the calculation outputs for each questionnaire item can be seen in Table 8.

Tabel 8. Domain Efficiency

Answer Options	Frekw	Total Score
Strongly agree	14	70
Agree	44	176
Doubtful	2	6
Don't agree	0	0
Strongly Disagree	0	0
Total	60	252

Referring to the calculated average score for the Efficiency variable, a score of 4.20 is obtained, and according to Table 2, the assessment falls within the 'Very Satisfied' range, indicating a positive signal that E-Puskesmas users are 'Very Satisfied' with the efficiency implications. The calculation results and data processing for the Services variable, which includes 4 questions related to E-Puskesmas, and the calculation outputs for each questionnaire item can be seen in Table 9.

Tabel 9. Domain Service

Pilihan Jawaban	Frek	Total Skor
Sangat Setuju	32	160
Setuju	73	292
Ragu-ragu	7	21
Tidak Setuju	4	8
Sangat Tidak Setuju	4	4
Total	120	485

Referring to the calculated average score for the Services variable, a score of 4.04 is obtained, and according to Table 2, it falls within the 'satisfied' range, indicating a positive sign that end-users are 'satisfied' with the performance displayed in the E-Puskesmas application.

The overall summary of variables, based on the calculation and data processing, according to the questionnaire distributed to the respondents who are employees of Belimbing public health center Padang in the Performance, Information & Data, Economic, Control & Security, Efficiency, and Services variables, shows that all values fall within the range of 3.83 to 4.20, signifying that end-users are 'satisfied' with the use of the E-Puskesmas application. However, E-Puskesmas should be enhanced and improved to maintain its performance within the 'good' range. The complete summary can be seen in Table 10.

Tabel 1. Recapitulation Results of Satisfaction Indicators for Using E-Puskesmas

Domain	Average	Categori
Performance	4,18	Satisfied
Information and Data	3,92	Satisfied
Economic	3,89	Satisfied
Control and Security	3,83	Satisfied
Efficiency	4,20	Very Satisfied
Service	4,06	Satisfied

4. CONCLUSION

The level of satisfaction with the implementation of the E-Puskesmas application at Belimbing public health center Padang, using the PIECES method, reveals that all aspects are in the satisfied category, with respective average satisfaction scores for performance (4.18), information and data (3.92), economic (3.89), control and security (3.89), efficiency (4.20), and service (4.06). Similar issues were identified as in previous research from observations and interviews, it was found that E-Puskesmas users utilize the same username and password to access the E-Puskesmas application. This practice potentially leads to the occurrence of incorrect data input or editing by unauthorized personnel in their respective departments. It is hoped that the management or decision-makers will convey to the application developers the necessity of assigning distinct usernames and passwords to each user. This would facilitate the easy tracing of the cause and the responsible user in the event of any issues. Due to time and resource constraints, this research was conducted at only one public health center. In the future, it would be more advantageous to conduct the study at all public health centers in the city of Padang to obtain a comprehensive understanding of user satisfaction with E-Puskesmas, as E-Puskesmas is utilized across all public health centers in the city of Padang.

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