Practicality of a Web-Based Information System for Teacher Data Management at SMKN 5 Padang

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ABSTRACT

This study aims to analyze the practicality level of a web-based management information system to support the process of managing the teacher database at SMKN 5 Padang. The development of this system is expected to provide an efficient, structured, and user-friendly solution for schools in managing teacher data. The research employed a quantitative method, focusing on measuring how practical the developed system is when used in real settings. The subjects of this study included 15 teachers and 1 principal at SMKN 5 Padang who participated in the product trial phase. The data were collected using a practicality questionnaire designed based on the Likert Scale. The results of the practicality test showed a percentage score of 92%, which is categorized as "very practical". This indicates that the web-based teacher database management system is highly applicable and usable in educational institutions. The findings suggest that the system is feasible to be implemented as a practical management tool that supports the digital transformation of school administration, particularly in organizing, updating, and accessing teacher information in a fast and integrated manner.

1. INTRODUCTION

The rapid advancement of information technology in the digital era has fundamentally transformed various aspects of human life, including how data is collected, processed, and utilized in decision-making processes. In today's increasingly information-driven world, the availability of accurate, timely, and accessible information is essential for improving the efficiency and effectiveness of organizational operations. As a result, the need for reliable and integrated information systems has become more urgent across various sectors, including education.

An information system is a structured framework composed of interconnected components that work together to gather, process, store, and disseminate information. Its purpose is to support decision-making, coordination, control, and analysis within an organization. One of the core components of an information system is the database, which serves as a systematic and organized collection of data. It allows for efficient access, retrieval, update, and analysis of information. In educational institutions, the implementation of database systems plays a crucial role in managing a wide array of data, including student records, teacher profiles, academic schedules, and administrative documentation.

In particular, teacher data management has emerged as a critical area within school administration. Teachers represent a central human resource in the educational process, and their data—ranging from personal profiles and educational backgrounds to teaching assignments, performance evaluations, and certifications—is both complex and dynamic. Accurate and up-to-

date teacher data is essential not only for administrative efficiency but also for planning professional development programs, allocating resources, and making data-informed policy decisions.

Despite this importance, many schools in Indonesia—including SMKN 5 Padang, a state vocational high school in West Sumatra—still rely on manual methods to manage teacher data. Typically, data is stored in printed documents or scattered spreadsheets across different departments, leading to various issues such as data duplication, input errors, difficulty in updating records, and slow retrieval of needed information. Furthermore, the school does not have a structured internal system for verifying and managing teacher data before it is submitted to the national education database system (Dapodik). This lack of internal control not only compromises data accuracy but also limits the school's ability to utilize the data for strategic planning and reporting.

To overcome these challenges, there is a clear need for the development of a web-based management information system that can function as an internal school platform for managing teacher databases. A system of this nature would enable real-time access to data, support digital record-keeping, ensure data accuracy through validation mechanisms, and streamline the processes of reporting and decision-making. According to Laudon (2012), an integrated management information system enhances organizational efficiency, accelerates information flow, and strengthens the foundation for strategic decisions. Moreover, such a system can promote transparency, accountability, and effective use of human resources.

By enabling teachers to access and review their personal data and by providing school administrators with comprehensive and up-to-date information, the system can serve as a reliable tool for performance evaluation, promotion decisions, and professional development planning. Agustiandra & Sabandi (2019) emphasized that a good information system makes it easier for users to obtain the information necessary for fast and accurate decision-making. Furthermore, as stated by P.W. Deni (2018), a database-based information system significantly enhances the operational efficiency of organizations, particularly in managing repetitive administrative tasks through the provision of valid and integrated information.

Nonetheless, the success of such a system depends not only on its technical design but also on the readiness of its users. The transition from manual to digital systems requires a change in work culture and competencies. SMKN 5 Padang still faces challenges in terms of staff readiness and digital literacy, which must be addressed through appropriate training, change management strategies, and stakeholder involvement. Sustainable implementation also requires commitment from school leadership, support from the local education authority, and engagement from the school community.

Therefore, the development of a web-based management information system for teacher database management at SMKN 5 Padang is both a strategic necessity and a relevant response to the current demands of educational administration. This study aims to design and develop such a system to help the school manage teacher data more systematically, accurately, and efficiently. The implementation of this system is expected to contribute significantly to improving the quality of human resource management in the school environment, supporting better decision-making, and strengthening institutional professionalism in a sustainable and modern way.

2. METHOD, DATA, ANALYSIS

This research adopts a quantitative research method aimed at empirically measuring the practicality level of the developed product. Through this approach, data is collected in the form of numerical values that are analyzed statistically to provide objective and measurable results. The use of a quantitative method allows the researcher to assess how practical the web-based management information system is when implemented in the actual school environment. The details of this quantitative approach are outlined as follows:

1. Drafting the Research Instrument

   The initial stage carried out in this study was drafting the research instrument, namely the practicality questionnaire. The development of this instrument serves to comprehensively measure the practicality level of the web-based management information system for managing teacher data. The practicality instrument was developed based on six indicators: Ease of Use,

Interface Design, Time Efficiency, Ease of Maintenance, Usefulness, and Ease of Integration, consisting of a total of 25 items.

Table 1. Practicality Instrument

No	Indicator	Number of Items	Item Numbers
1	Ease of Use	5	1,2,3,4,5
2	Interface Design	5	6,7,8,9,10
3	Time Efficiency	4	11,12,13,14
4	Ease of Maintenance	4	15,16,17,18
5	Usefulness	4	19,20,21,22
6	Ease of Integration	3	23,24,25
	Total Number	25	

2. Expert Validation

Before being used in data collection, the developed instrument must first be validated by experts. The steps in this stage include:

a. The purpose of creating the validation instrument is to assess the validity of the research tool, specifically to determine whether it is appropriate and reliable for use in the study. The validation instrument is designed based on theoretical indicators that align with the objectives of the research and the functionality of the developed system. It includes several dimensions such as accuracy, relevance, consistency, functionality, security, ease of use, and compliance with applicable standards. These indicators are translated into specific items that are evaluated by experts using a Likert scale to measure the level of agreement with each item. The development of this instrument ensures that the content is both comprehensive and representative of the constructs being measured. It serves as a foundation to guarantee that the research tool can provide valid, consistent, and meaningful data. The detailed distribution of the indicators and corresponding items is presented in the following table:

Table 2. Validity Instrument

No	Indicator	Number of Items	Item Numbers
1	Accuracy	3	1,2,3,
2	Relevance	4	4,5,6,7
3	Consistency	3	8,9,10
4	Functionality	4	11,12,13,14
5	Security	4	15,16,17,18
6	Ease of Use	4	19,20,21,22
7	Compliance	3	23,24,25
	Total Number	25	

b. Selecting an Expert (1 expert from the supervising lecturer)

The validation process involves the selection of a qualified expert to evaluate the research instrument. The expert is selected based on their academic background, professional experience in educational research, and expertise in system development. In this study, the supervising lecturer is appointed as the expert validator. Their role is to assess each item in the validation instrument, provide constructive feedback, and determine the appropriateness of the instrument in measuring the intended constructs.

c. Validity Testing of the Research Instrument

Once the expert has reviewed and rated the instrument, the next step is to conduct a validity test. This process involves analyzing the expert's evaluation to determine whether each item is valid and aligned with the research objectives. The validation results help in deciding whether the instrument can be implemented directly or requires revision and refinement. A valid instrument ensures accurate measurement of the variables under study, ultimately supporting the reliability and credibility of the research findings.

Table 3. Validity Analysis Results

Item	Expert Judgment	Percentage	Criteria
1	4		
2	5	87%	Very Valid
3	4		
4	4		
5	4	80%	Valid
6	4		
7	4		
8	5		
9	5	100%	Very Valid
10	5		
11	4		
12	5	95%	Very Valid
13	5		
14	5		
15	4		
16	5	95%	Very Valid
17	5		
18	5		
19	5		
20	5	85%	Very Valid
21	4		
22	4		
23	4		
24	5	87%	Very Valid
25	4		
25	112	89,6%	Very Valid

3. The Data Collection

Data collection in this study was conducted using four techniques: questionnaires, observation, interviews, and documentation study. These techniques were employed to obtain comprehensive and accurate data regarding the practicality of the web-based management information system developed for managing teacher data at SMKN 5 Padang.

a. Questionnaire

A practicality questionnaire was distributed to 15 teacher respondents and the school principal at SMKN 5 Padang. The purpose of this questionnaire was to collect users' perceptions of the practicality of the system in actual use. The questionnaire consisted of 25 items based on six indicators: Ease of Use, Interface Design, Time Efficiency, Ease of Maintenance, Usefulness, and Ease of Integration. Respondents answered using a Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The data obtained were then analyzed quantitatively to determine the overall practicality level of the system.

b. Observation

Observation was carried out directly during the product trial phase to see how the teachers and school principal interacted with the system. The researcher observed the ease of access, navigation flow, responsiveness, and how users utilized the system's features in managing teacher data. This observation aimed to support and validate the data collected through the questionnaire.

c. Interview

Interviews were conducted with selected participants, including the school principal and several teachers, to gather more in-depth information about their experiences and opinions regarding the use of the web-based system.

d. Documentation Study

A documentation study was conducted by reviewing relevant documents such as user reports, existing teacher data records, and previous systems used by the school. This stage was intended to compare the effectiveness of the newly developed system with the previous methods and to provide evidence of improvement in data management practices.

4. Data Analysis Techniques

The data analysis techniques used in this study aim to process data obtained from the validation and practicality tests of the web-based management information system that has been developed. The two types of analysis employed are validity analysis and practicality analysis, with the main focus on assessing the practicality of the system based on the respondents feedback.

To determine the level of practicality of the system, the data obtained from the questionnaire responses are analyzed using the following average formula:

$$\bar{x} = \frac{\sum x}{n}$$

Explanation:

x: Average score

$\sum$x: Total score from all respondents

n: Number of respondents

The practicality score is calculated using the following formula:
Practicality Score = (Average Score/Maximum Score) ×100%

The result is then categorized according to the level of practicality using the following criteria:

81% – 100%	Very Practical
60% – 80%	Practical
41% – 60%	Fairly Practical
21% – 40%	Less Practical
Less than 21%	Not Practical at All

Through this analysis, the researcher can determine how practical the developed information system is perceived to be by users in managing teacher data at school

3. RESULT AND DISCUSSION

A. Measured Product

The designed system interface can be further detailed as follows:

1. Login Page

The login page is the initial display that users must access before entering the system. This page design is based on a storyboard as a guide for the user interface layout. The goal is to ensure that the login page is easy to understand and use, with simple and functional elements such as username and password input forms.

Figure1. Login Page

2. Dashboard Page

The dashboard serves as the main control center after the user successfully logs in. On this page, users can view important summarized information, such as the number of users and teacher records, through colorful visual widgets. A vertical navigation menu on the left side allows easy access to other features like Teacher Data, User, and Logout. This layout is designed to enable users to access information quickly without switching between too many pages.
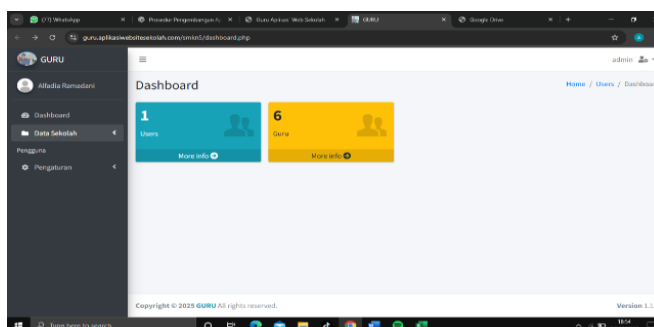

Figure 2. Dashboard Page

3. User Page

This page displays data of all users who have access to the system, such as admins or school operators. The information is presented in a table that includes the user's full name, username, and access level. There is a "+ Add User" button for adding new users, as well as edit and delete buttons for modifying user data. A search feature is also available to help users find specific data more efficiently.
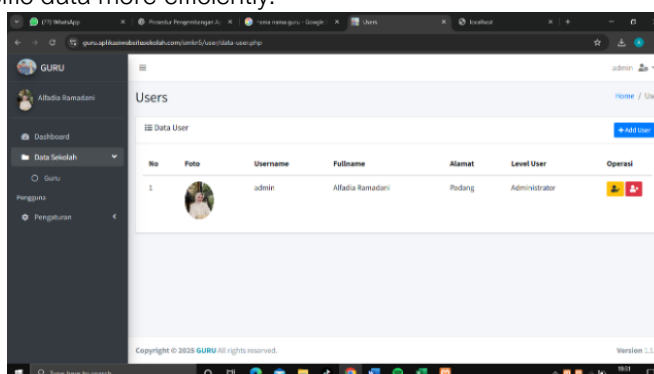

Figure 3. User Page

4. Teacher Data Page

This is one of the core features of the system, displaying a complete list of registered teachers in an interactive table format. The data shown includes serial number, teacher ID

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(NIP), full name, profile photo, employment status (PNS/Non-PNS), and work unit. An operation column provides buttons for editing, deleting, and viewing teacher details. This page helps admins or operators manage and update teacher information efficiently.
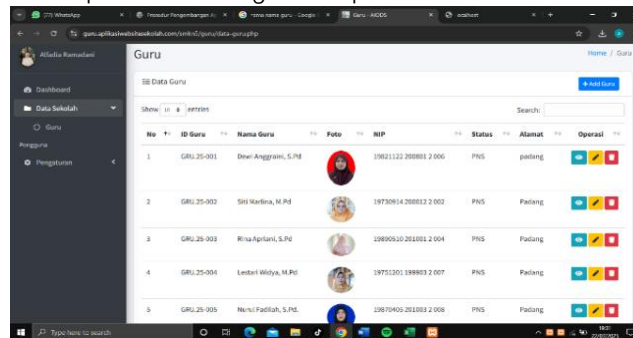

Figure 4. Teacher Data Page

5. Teacher Detail Information Page

This page displays comprehensive and detailed data of an individual teacher, including identity and work history. There are buttons available for editing or updating teacher data directly. At the top right of the page, a "Add Data" button is available for adding new teacher records through a structured input form.
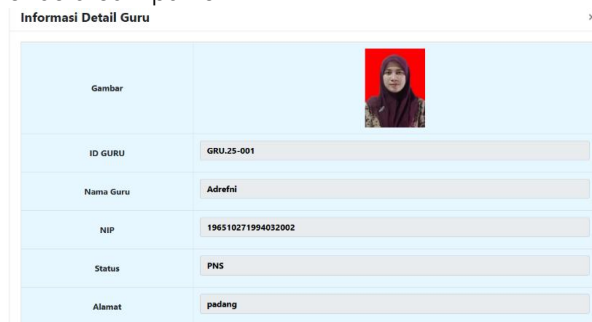

Figure 5. Teacher Detail Information Page

B. Result

The practicality instrument was developed based on six indicators: Ease of Use, Interface Design, Time Efficiency, Ease of Maintenance, Usefulness, and Ease of Integration

Table 4. Practicality Test Results

No	Indicator	Number of Items	Total Score	Percentage	Description
1	Ease of Use	5	351	93%	
2	Interface Design	5	338	90%	
3	Time Efficiency	4	280	93%	
4	Ease of Maintenance	4	269	90%	Very Valid
5	Usefulness	4	281	93%	
6	Ease of Integration	3	203	90%	
	Overall Total	25	1723	92%	

The instrument used was a practicality questionnaire consisting of several assessment indicators, such as accuracy, relevance, consistency, functionality, security, user-friendliness, and compliance with standards. Each indicator contained several statement items assessed using a Likert scale.

C. Discussion

The findings of this study provide answers to the main research problem: how to develop a practical, valid, and efficient web-based management information system to manage

teacher databases at SMKN 5 Padang. The system was successfully developed and tested, with the results indicating that it meets the practical needs of users while maintaining a valid structure based on expert validation. The practicality score of 92% demonstrates that teachers found the system highly usable, efficient, and easy to understand. This confirms that the system aligns with the principles of user-centered design, emphasizing accessibility and intuitive interfaces. Moreover, the validation score of 89.6% from experts further supports the system's technical adequacy, data organization, and functionality.

These findings support the existing body of knowledge regarding the integration of information systems in education. Previous studies (e.g., Agustiandra & Sabandi, 2019) emphasized the need for structured systems to support school decision-making. The current research contributes by presenting a real-world implementation tailored specifically for vocational high schools (SMK), where teacher data is frequently updated and used for national systems like Dapodik. In practice, the system reduces dependency on manual documents and fragmented spreadsheets, addressing long-standing issues such as data redundancy, inaccessibility, and lack of real-time updates. The centralized web-based solution brings improvements in data accuracy, management efficiency, and accessibility for school administrators. From a theoretical standpoint, the study reinforces the role of Management Information Systems (MIS) in improving decision-making, administrative transparency, and human resource management. The findings also indicate the potential to scale the system for broader institutional use or integrate it with national education systems in the future.

Overall, this study successfully integrates research findings into practical applications, confirming that tailored web-based MIS can significantly enhance the digital transformation of school administrative processes. Future research could explore the integration of analytics, teacher performance dashboards, or mobile apps to complement the current system.

4. CONCLUSION

Based on the research and development that has been conducted, it can be concluded that the web-based management information system for managing teacher databases at SMKN 5 Padang has met the criteria for both validity and practicality. Validation by a media expert indicated that the system is appropriate for use in terms of interface design, database structure, ease of use, and the completeness of features that align with the school's administrative needs. The practicality test involving 15 teachers resulted in an average score of 1.723, with a practicality percentage of 90%, which falls under the "Very Practical" category. This indicates that the system is easy to understand, efficient, and helpful in supporting users with administrative tasks. The system was developed using open-source technologies such as PHP, MySQL, and XAMPP, featuring a simple, informative, and responsive user interface. Developed through a procedural approach, this system is considered a viable solution for centralized and digital teacher data management. Therefore, it is recommended for adoption by other schools with similar needs and can serve as a reference for developers and educational policymakers in promoting digital transformation in school administration.

5. ACKNOWLEDGE

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