

Analyzing UI and UX of Verval PTK: Impact on Elementary School Data Precision

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Abstract: This study investigates the implementation and impact of Verval PTK in educational data management in Jember Regency. The presence of technology is considered crucial for enhancing the efficiency and accuracy of educational data. This study delves into two primary research inquiries: Firstly, it examines how users perceive the user interface of the Verval PTK in accelerating administrative processes and teacher data maintenance. Secondly, it investigates the main challenges encountered by primary schools in the adoption of the implementation Verval PTK. Employing a qualitative descriptive differential approach, this research involves five elementary schools that have adopted the Verval PTK system. Data are collected through in-depth interviews and observations, then analyzed using three stages: usability testing, performance measurement using Lighthouse, and A/B testing. The findings of the study reveal a positive response from school operators towards Verval PTK, although some challenges related to platform accessibility and stability persist. Nevertheless, performance measurement indicates excellent scores, with a focus on improving low SEO values. A/B testing also suggests a significant improvement in time efficiency and data accuracy with Verval PTK. Based on these findings, it is recommended to enhance the stability, accessibility, and SEO optimization of Verval PTK. Regular software updates, efficient error management, and real-time performance monitoring are essential for sustainable development. Thus, these measures are expected to strengthen the role of Verval PTK in supporting the efficiency and accuracy of educational data management in Indonesia.

Keywords: A/B Testing, Jember Regency, Performance Measurement, Usability Testing, Verval PTK.

INTRODUCTION

In the rapidly evolving landscape of the 21st century, the influence of technology has become increasingly pervasive, transforming various aspects of our lives. The technological revolution has penetrated and provided profound transformations in various layers of human life (Polnaya et al., 2023). The development of information technology growth has created fundamental changes in various aspects of life, In the course of technological evolution that continues to surface, the impact is not only felt on the surface, but has permeated and provided a deep transformation, covering various aspects of human life, including in the education sector (Rahman, 2020). In this era, Verification of Educators and Education Personnel through the Verval PTK application is an innovation that emerged with the main aim of increasing efficiency and accuracy in validating educator data (Azzahrah, 2023).

Elementary school in Jember Regency represents the main foundation in the formation of children's character and skills (Budyawati et al., 2021). Educators, with high qualifications and understanding of rapid technological developments play a central role in delivering quality learning, and can facilitate the learning process related to technological novelty in the education system in Indonesia offered by the government, where in the era of 5.0 humans are forced to coexist with technology in order to improve quality of life and sustainability (Hapudin, 2021; Miswar et al., 2023).

Verval PTK is a digital system introduced in the realm of education to ensure the accuracy and validity of data related to educators in educational institutions (Kemendikbud RI, 2022). The system is designed with the primary objective of minimizing administrative errors, increasing efficiency, and providing a reliable database related to the attendance and qualifications of educators. Through Verval PTK, educators are expected to easily update and verify personal data, educational history, and other relevant information (Kemendikbud RI, 2022). One of the main advantages of Verval PTK is its ability to increase transparency and accountability in educator data management, which can help educational institutions and related parties in making more informed and effective decisions. These systems often utilize cutting-edge technologies such as mobile applications, online platforms, and

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data security to ensure the integrity and security of the information stored in their databases. Over time, Verval PTK continues to evolve to align itself with the demands of technological developments and administrative needs in the world of education (Kemendikbud RI, 2022).

The results of a pre-survey of research in Jember Regency revealed that elementary school face a number of significant challenges related to the administrative process of their teachers. These issues include managing educators' data, maintaining accurate information, and organizing administration efficiently. To overcome the complexity of these administrative challenges, the Jember Regency government is innovative and implements technology-based solutions. In this context, the Verval PTK application emerged as the first and very important instrument in managing the data administration of educators in Jember Regency. With the implementation of Verval PTK, it is expected that efficiency and accuracy in the collection and maintenance of elementary school data can increase substantially. This application is designed to simplify and speed up the administrative process, helping in tracking and monitoring teacher data more effectively. Through various initiatives and developments, the elementary school sector in Jember Regency is undergoing a real transformation. These changes reflect the government's commitment to providing quality and equitable education for all young people in the region.

Based on the phenomenon successfully documented in the preliminary survey, where the elementary school sector in Jember Regency emerged as the focal point, this study aims to address two primary research inquiries: "Firstly, how do users perceive the user interface of the Verval PTK application in accelerating administrative processes and teacher data maintenance? Secondly, what are the main challenges faced by primary schools in the adoption of the implementation Verval PTK application?". Characterized by its dynamic educational landscape, Jember Regency presents unique challenges and needs in the management of educator and education personnel data. Consequently, the integration of Verval PTK in elementary schools across Jember Regency warrants in-depth scrutiny. This study will delve into technical intricacies such as usability testing, performance evaluation, and A/B testing. Furthermore, it will meticulously delineate the hurdles potentially encountered during the implementation of the PTK verification system, whilst proffering comprehensive solutions and recommendations aimed at enhancing the efficacy and efficiency of educational administration, particularly within the elementary school milieu of Jember Regency.

LITERATURE REVIEW

The state of the art in research related to technology in learning shows the evolution of understanding and application of technology in various contexts. The role of technology in facilitating student creativity and providing access to interactive learning resources is underscored, with a call to address negative impacts and challenges in subsequent research (Amelia et al., 2023). Additionally, new perspectives are offered through exploration of technology implementation strategies to enhance financial reporting quality, providing significant insights into the financial domain (Nisaa et al., 2024). Correspondingly, the potential application of information technology to improve educational efficiency is discussed, aiming to provide a foundation for decision-making in education management (Febrianti et al., 2023).

An overview of the paradigm shift in learning and educational transformation with digital technology is presented, highlighting the transition from teacher-centered to technology-based learning approaches. Furthermore, the complexity of educational technology's role in shaping adaptive education in the digital era is emphasized (Purba et al., 2023; Ramadhan et al., 2023). New perspectives are presented by exploring unique learning experiences through technology integration can understanding of how technology creates advanced learning experiences is a valuable contribution in understanding the impact of technology on learners (Miasari et al., 2022).

This previous research underscores ongoing research trends in learning technology, focusing on understanding both the positive and negative impacts of technology in educational contexts. While previous research has illuminated the positive role of technology in various aspects of human development, further emphasis is needed to explore areas such as the effectiveness of Verval PTK in Indonesia. This study aims to address this gap in the literature by examining the development of Verval PTK as a part of technological advancements in the Indonesian education system.

METHOD

Research Design

Based on the research objectives, this research design adopts a differential descriptive qualitative approach, focusing on elementary school in Jember Regency that have implemented the Verval PTK system. The measurement in this study will focus on technical aspects, such as usability testing, performance measurement, and A/B test. The collected data will be processed and presented in graphic form for easy interpretation. Researchers will maintain the confidentiality of overall data, especially those that are private and can have an impact on the lives of sources.

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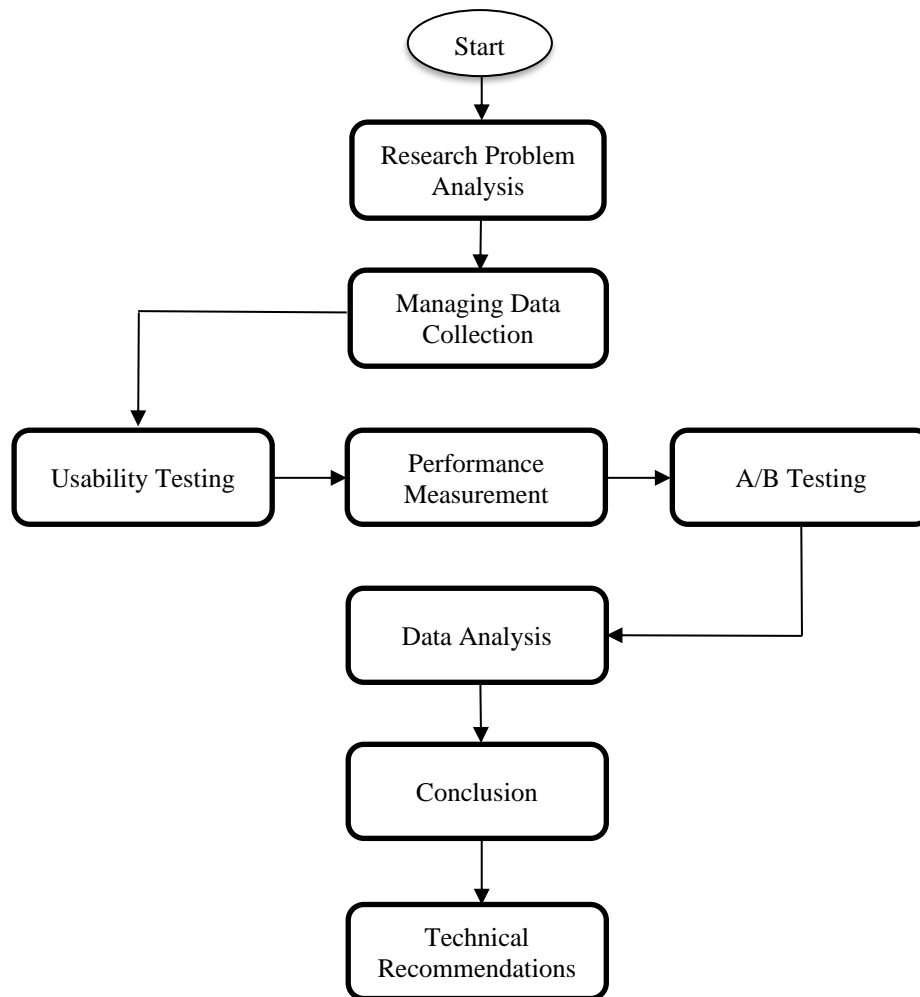


Figure 1. Research Design

Population and Sample

Based on data from the Central Statistics Agency of Jember Regency, the population of elementary school in the district in the 2020/2021 school year reached 1036 schools divided into 31 sub-districts in the Jember Regency Area (BPS Kabupaten Jember, 2022). This population includes all elementary school in Jember Regency, including public and private schools. This elementary School population becomes the starting point in conducting research or analysis related to education in the region. In the context of statistics or research, population refers to all elements that are the focus of research. In this case, all elementary school in Jember Regency (Sugiyono, 2017).

Researchers decided to involve five elementary school as research samples. The five schools include SD Negeri Jember Lor 2, SD Negeri Kepatihan 1, SD Negeri Jember Kidul 2, SD Negeri Kebonsari 1, and SD Negeri Patrang 1. This sample selection is not done haphazardly, but is based on considerations of time and cost efficiency, taking into account locations close to where researchers live. In these studies, time and cost efficiency were major factors in determining the sample, and this could be beneficial for research that has limited resources (Sugiyono, 2014).

Research Procedure

- 1. Data Collection:** In-depth interviews, observations, and application of checklists of technical aspects in the sample elementary school, including:
 - **Usability Testing:** Evaluation of the user interface using a series of questions that aims to measure the level of understanding and ease of use.
 - **Performance Measurement:** Measurement of application performance, including response time and operational speed. Performance measurement in this study using the help of the Lighthouse application. This is so that the performance of the Verval PTK web application can be observed validly and systematically. Additionally, performance measurement in this study

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also serves to systematically validate the findings obtained from user experience interviews conducted during the analysis of usability testing.

- **A/B Testing:** A comparison between two versions to identify changes that can improve performance. Comparison in this study using Verval PTK and Input manually. This is intended so that there is a comparison whether Verval PTK is proven to be a concrete solution of efficiency compared to manual data input in validating teacher data in the practitioner's view.
2. **Data Analysis:** The data that has been obtained will be processed and analyzed using tables and charts in order to facilitate analysis which will ultimately form final conclusions and recommendations for technological advances in the world of education.

RESULT

Usability Testing

Usability testing within the framework of this study involves respondents from among sample school operators who are expected to provide feedback regarding their experience in accessing and operating the Verval PTK application, while utilizing available features with the aim of increasing efficiency in administrative tasks. The synthesis of these responses is presented in table 1, reflecting a generally positive view of this application. However, some educational institutions face barriers related to platform accessibility and stability that need to be elaborated further for holistic understanding.

Table 1. School Operator Synthesis of Verval PTK and Administrative Efficiency

Elementary School	Feedback on Verval PTK and Its Efficiency
Elementary School 1	Feel comfortable and efficient, even though sometimes access difficulties due to the network.
Elementary School 2	Access and operate Verval PTK comfortably, but sometimes experience obstacles such as difficulty accessing.
Elementary School 3	Having difficulties sometimes, especially when the website is down, but its features help in managing educator data.
Elementary School 4	A positive experience with helpful features, but sometimes hampered when the website is down.
Elementary School 5	Although the features are complete, it is sometimes difficult to access due to technical obstacles such as website down. Technical improvements are needed to improve efficiency.

Performance Meauserement

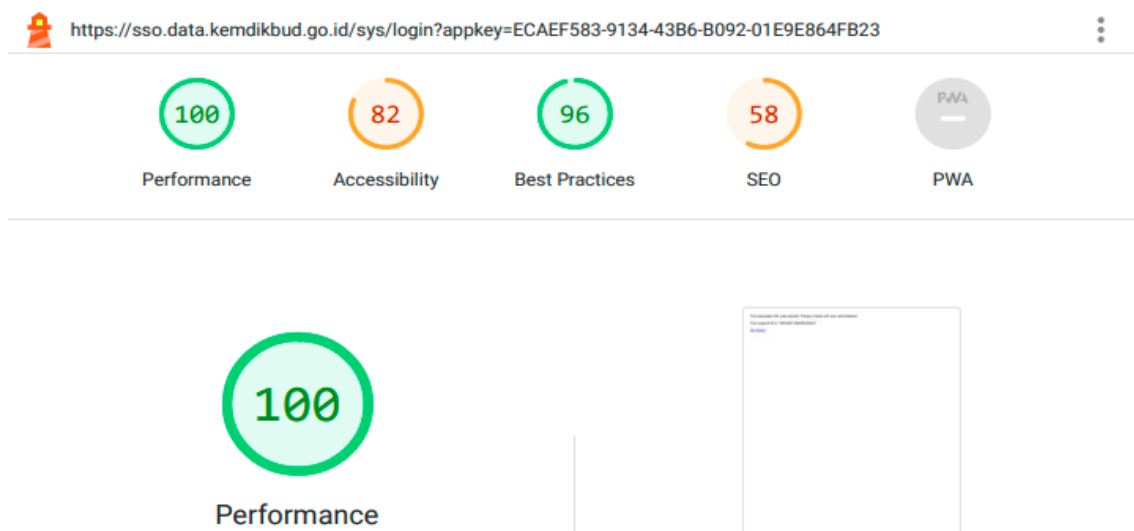


Figure 2. Sample of the Lighthouse Performance Results for Verval PTK Website

Based on the performance measurement of the Verval PTK website using Lighthouse, there are consistently excellent performance scores observed across all sampled elementary schools in Jember Regency. This indicates

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a commendable level of efficiency and reliability in the functioning of the Verval PTK platform within the educational context of the region. Detailed results can be seen in Figure 3.

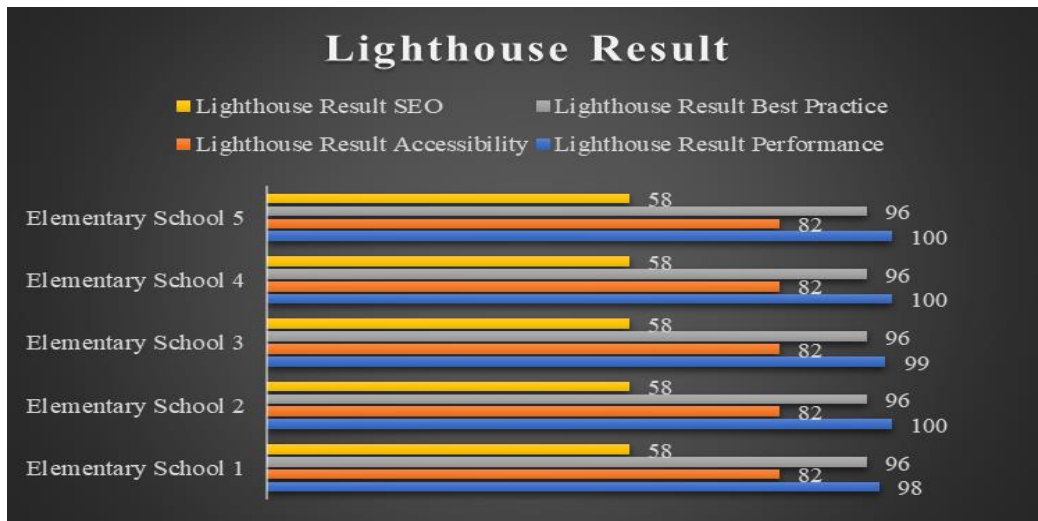


Figure 3. Lighthouse Performance Results for Verval PTK Website

Based on the Lighthouse measurement results from five elementary schools surveyed in Jember Regency, data illustrates the performance of the Verval PTK website. Performance scores provided by Lighthouse for each elementary school indicate notably high figures, ranging between 98 to 100. This signifies that the Verval PTK website exhibits swift loading speeds and responsiveness to user requests. However, there exists a considerable disparity in accessibility scores, ranging around 82. This suggests room for improvement in website accessibility to ensure inclusivity and usability for a diverse user base, including those with special needs.

Concerning adherence to best practice standards, all elementary schools demonstrated uniform scores of 96. This indicates overall compliance with established best practice standards, such as the use of clean code, image optimization, and HTTPS usage. However, an area warranting further attention is the SEO (Search Engine Optimization) score, consistently rated at 58 for each elementary school. This score implies scope for enhancement in search engine optimization efforts, facilitating improved discoverability and accessibility of the Verval PTK website for online users. Thus, the Lighthouse measurement results offer valuable insights into the performance of the Verval PTK website, providing a basis for further enhancements to enhance user experience and compliance with higher accessibility and SEO standards.

A/B Testing

The analysis then proceeds with the application of the A/B Testing technique. This method allows us to conduct a comparative study between two groups: one that utilizes the Verval PTK application and another that does not. By doing so, we can objectively measure the impact and effectiveness of the Verval PTK application in accelerating administrative processes and maintaining teacher data. This rigorous approach ensures that our findings are based on empirical evidence, thereby providing a solid foundation for any subsequent recommendations or strategic decisions. The results can be seen in figure 4.

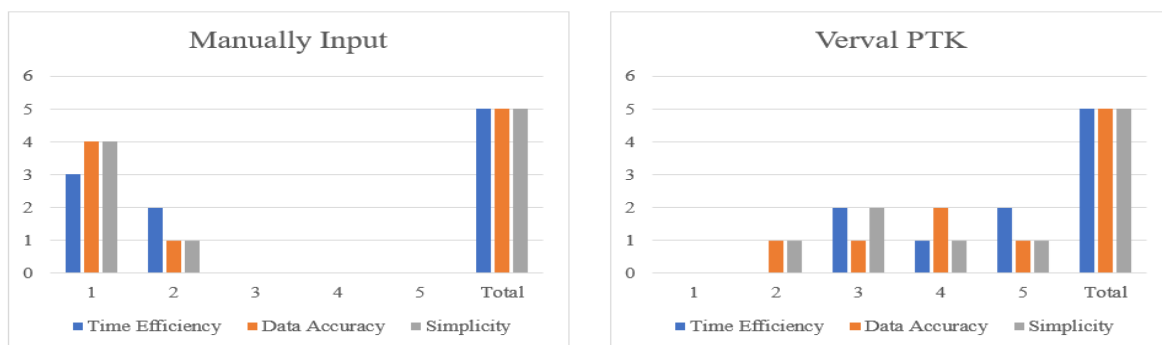


Figure 4. A/B Testing Results

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Evaluation manually input without Verval PTK by five sample respondents, the majority responded by giving low marks, especially in all aspects. Most of them rated the time efficiency by 1, indicating that the previously implemented manual process was considered inefficient. The same thing happened in the convenience aspect, where the majority of respondents gave a value of 1, indicating that this manual process was considered difficult. The accuracy of the data also received a similar assessment. On the contrary, with the implementation of Verval PTK, there are striking improvements. Time efficiency improved significantly, with the majority of respondents giving it a 4 or 5. The accuracy of the data has also improved, reflected in the majority of values of 4 or 5. In addition, Verval PTK's ease of use was rated higher, with the majority of respondents giving it a rating of 4 or 5, indicating that Verval PTK's interface was considered more intuitive compared to previous manual processes that were considered difficult and inefficient. Thus, the implementation of Verval PTK positively affects efficiency, data accuracy, and perceived ease of use in the context of educational data management. Although the implementation of Verval PTK received a positive response from most school operators in A/B testing, it is important to note that some respondents still gave low scores on measuring data accuracy and ease. These results indicate that, although Verval PTK has generally provided significant improvements, there are still certain weaknesses that need to be observed and corrected.

DISCUSSIONS

The results showed a fairly complete picture related to the application of Verval PTK in the context of managing education data in Jember Regency. In general, the results of usability testing show a positive response from school operators to this application. The majority of them admit that Verval PTK is able to increase efficiency in their administrative tasks. However, there are notes regarding the accessibility and stability of the platform that affect some educational institutions. In measuring the performance of the Verval PTK website, the results from Lighthouse show a very good performance score, especially in elementary school 1 to 5 in Jember Regency. Nevertheless, special attention needs to be paid to the value of SEO which is still relatively low in all schools. This factor can be the focus of improvements to improve visibility and search through search engines, which is important in ensuring the accessibility of educational information.

A/B testing in this study shows that the comparison between the use of Verval PTK and without Verval PTK provides an interesting picture. The implementation of Verval PTK significantly improves time efficiency, data accuracy, and perceived ease of use. Although the majority of respondents gave positive responses, there were also some who gave low scores on data accuracy and convenience. This indicates certain weaknesses that need further attention. It is important to consider the variability of results among respondents. Some institutions may face specific challenges or difficulties that affect their perception of data accuracy and ease of use. Therefore, improvement and development recommendations can be directed towards understanding the specific needs and challenges of the group of respondents who gave the low score. In addition, further evaluation needs to be carried out regarding the factors that affect the accessibility and stability of the platform, as well as strategies to increase the SEO value on the Verval PTK website. This discussion can be the basis for developing a holistic follow-up plan to optimize the contribution of Verval PTK in supporting education data management.

The positive response of the majority of school operators to Verval PTK shows that technology can be an effective tool in speeding up administrative processes and improving the quality of data management (Amelia et al., 2023). In this context, this research provides empirical support to the belief that technology, when implemented appropriately, can bring about significant positive changes in the education sector (Ancient et al., 2023). Along with the change in learning paradigm and education transformation brought about by the development of digital technology, this research makes a real contribution to the understanding of how technology can be a driver of the effectiveness of education data management in the modern era (Ramadan et al., 2023). These findings go hand in hand with research Miasari et al., (2022), which highlights that the integration of technology in learning creates an advanced and unique learning experience for learners. Nisaa et al., (2024) Provide important perspectives on technology implementation strategies in improving the quality of financial reporting, providing special insights on the transformation of internal audit and financial statement management. Thus, this research builds a strong foundation on previous knowledge and integrates it in the context of Verval PTK application development.

Based on the findings in this study, a number of technical recommendations can be proposed for the development of Verval PTK in the context of education data management in Jember Regency. First of all, the stability and accessibility of the platform should be the main focus. In-depth evaluation of factors affecting stability and accessibility needs to be done, and technical corrective steps should be taken to ensure users can access the application smoothly. Increased visibility through search engines can be achieved with SEO optimization. Practical measures such as keyword analysis, proper utilization of meta tags, and improvements to URL structure will improve Verval PTK's ranking in search results, providing educational information sustainability. In order to improve user experience, it is necessary to conduct usability testing regularly involving school operators as the main users. An effective implementation of a feedback loop can also help the development team respond quickly to feedback or suggestions. Regular software updates using the concepts of Continuous Integration (CI) and Continuous Deployment (CD) are important in the context of continuous development. This will ensure Verval

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PTK is always on top of the latest version with bug fixes, and relevant new features. A deeper analysis of accessibility barriers needs to be undertaken, with particular emphasis on identifying causal factors and implementing scalable technical solutions. It is also important to improve error management with efficient implementation of error logs, making it easier for development teams to detect, analyze, and fix technical issues in a timely manner. Code quality should also be emphasized through good coding practices, such as Code Review and Static Code Analysis. Finally, the implementation of real-time performance monitoring tools will enable early detection of potential issues, including comprehensive monitoring of servers, databases, and application responses. By adopting these recommendations, it is hoped that the development of Verval PTK can achieve a higher level of technical perfection, supporting the efficiency of education data management in Indonesia.

CONCLUSION

Overall, this study provides a comprehensive picture related to the implementation of Verval PTK in managing education data in Jember Regency. The results of usability testing showed a positive response from the user experience, but challenges related to user interface, platform accessibility and stability need to be addressed. Performance measurement using lighthouse indicates a good level of performance with special attention to improving SEO value. A/B testing showed significant improvements in time efficiency and data accuracy with the implementation of Verval PTK, although further analysis is still needed regarding some low scores. Technical recommendations are recommended to improve stability, and accessibility, as well as SEO optimization. Regular software updates, efficient error management, and real-time performance monitoring are also key in continuous development. Thus, these steps are expected to strengthen the role of Verval PTK in supporting the efficiency and accuracy of education data management in Indonesia.

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