An In-Depth Analysis of SIMPKB: Revealing Performance Tests and Efficiency from a User Experience

Hariono Ponco Adi[1)*], Ari Eko Wardoyo[2)], Habibatul Azizah[3)]
[1,2,3)] Information Technology, Universitas Muhammadiyah Jember, Indonesia
1)pradikaa993@gmail.com, 2)arieko@unmuhjember.ac.id, 3) habibatulazizah@unmuhjember.ac.id

Abstract: This study comprehensively analyzes the performance and usability of the SIMPKB website in the context of teacher professional development. This research carries a qualitative descriptive approach with the aim of deeply understanding the performance and usability of the SIMPKB website. This research consists of two complementary stages, the first involves performance testing using GT Metrix software, and the second phase focuses on in-depth interviews with 5 driving teachers in Jember Regency by applying the concept of the Five Dimensions of Usability (5E) model. Through performance testing using GT Metrix and 5E interviews with driving teachers, significant findings have been revealed. Although SIMPKB shows relatively good response speeds, there are areas of improvement that can be improved, especially in terms of loading times and Largest Contentful Paint (LCP). The 5E evaluation of the mobilizing teacher provides an in-depth perspective on the effectiveness, efficiency, engagement, errors, and ease of learning on the platform. The test and interview results complement each other, providing a holistic picture of SIMPKB's condition and potential improvement. Improvement recommendations, which involve improving response speed and improving usability, can be a foothold for improving the user experience. Further research is recommended to explore optimizing technical performance, implementing more intuitive interface designs, and evaluating the impact of implementing improvements on user effectiveness. By adopting these recommendations, SIMPKB can continue to develop as an effective, efficient, and user-friendly platform in supporting teacher professional development.

Keywords: Design interface, GT Metrix, Jember Regency, SIMPKB, Website performance.

INTRODUCTION

Technological advancements have brought fundamental changes in various aspects of life. This transformation covers various sectors, ranging from communication, education, to industry. Rapid developments in computing, internet connectivity, and artificial intelligence have opened up new opportunities and created new paradigms in the way we interact with the world (Bangsawan, 2023; Gill et al., 2022). The advent of sophisticated mobile devices, cloud computing platforms, and sophisticated data analytics has changed the way we work, learn, and communicate. Technology is also a key driver in solving global challenges, accelerating innovation, and expanding the boundaries of knowledge (Hartatik et al., 2023). In this context, a deep understanding of technological developments is crucial to make optimal use of them, both in personal and professional contexts (Widyawati &; Sukadari, 2023). Technological advances have also permeated the education sector, bringing significant changes in teaching and learning methods. The use of technology in education, known as EdTech, has opened the door to wider access to education and increased the effectiveness of learning (Pustikayasa et al., 2023; Setiawati et al., 2023). Online platforms, distance learning, and educational applications have enabled students and educators to engage in the learning process flexibly, not limited by geographical boundaries (Rachmi et al., 2024; Said, 2023). Learning management systems provide efficient administrative and organizational facilities for teachers and students (Saifulloh & Dervish, 2020). In addition, the use of creative software and interactive simu.lations provides a more dynamic and engaging learning experience (Permata et al., 2024).

In the context of professional education, technology has provided a significant boost SIMPKB as a concrete example. SIMPKB stands for "Sistem Informasi Manajemen Pengembangan Keprofesian Berkelanjutan" in

Bahasa Indonesia, which translates to "Management Information System for Sustainable Professional Development." It is a system designed to support the continuous professional development of teachers in Indonesia. SIMPKB, or the Sustainable Professional Development Management Information System, is a crucial tool in the landscape of education in Indonesia. Designed to support continuous professional development for teachers, including those instructing prospective teachers. At its core, SIMPKB provides a platform where educators can access resources and customized training modules to enhance their skills and teaching methodologies. The system plays a pivotal role not only in administrative tasks but also in fostering a conducive environment for learning and sustainable improvement among educators. SIMPKB represents how technology-based platforms can support educators' professional development by providing easy access to information, training, and educational resources (Purnama, 2021). These advances have also opened the door to global collaboration and knowledge exchange among educators (Djusar et al., 2023). With technology, teachers can connect with a community of educators from around the world, share best practices, and continue to develop their skills (Novelita et al., 2023). With the continuous development of educational technology, new challenges and opportunities continue to arise. It is important for stakeholders in the field of education to continue to understand and adapt technological innovations so as to improve the quality of education and prepare future generations to face the demands of a changing world (Rambung et al., 2023). Research on SIMPKB is important because this system has a direct impact on the quality of education provided by teachers. By understanding how teachers utilize and interact with SIMPKB, valuable insights can be gained into how technology can be leveraged to support teachers' professional development and, ultimately, enhance the quality of education.

SIMPKB as a technology platform, facilitates the process of personnel management and professional coaching in an integrated manner (Wiradimadja et al., 2021). Through SIMPKB, teachers can access information about personnel policies, apply for professional development, and monitor their professional development history (Puspitasari, 2022). With a computerized approach, SIMPKB enables efficient data management, reduced administrative burden, and increased transparency. The use of technology in SIMPKB also facilitates the development of curriculum, training, and learning resources that can be accessed online (Nipriansyah et al., 2022). Teachers can attend professional training and get the latest information about innovations in Education (Hasanah et al., 2023). Thus, SIMPKB contributes positively to improving the quality of education and teacher professional development (Zulfa, 2024). However, as part of an in-depth analysis, it is necessary to understand the extent to which the SIMPKB website can optimize its performance and efficiency. Focused performance tests and efficiency analysis from a user experience perspective will provide deeper insight into the potential for system development and improvement.

The study took inspiration from the findings Harsono (2022) which confirms that technology-based management information systems play a key role in achieving success. Listening to the research, attention to the role of SIMPKB as a management information system in teacher professional development is increasingly strengthened. The success of SIMPKB can not only be measured by administrative efficiency, but also the extent to which this system supports the growth of teacher professionalism and the improvement of teaching quality. The importance of SIMPKB in the context of professional development lies in its capacity to provide accurate and easily accessible information, enabling teachers to be actively involved in development programs relevant to their needs. Therefore, in this study, the focus will be given to two main aspects, namely SIMPKB performance testing and evaluation of its efficiency from the user's perspective.

Performance testing will involve analysis of SIMPKB's response speed, and system availability, this performance analysis will be measured with the help of GT Metrix. GT Metrix will provide information related to page load times, total page size, and suggestions for improvements to improve performance (Sarita et al., 2022). Thus, the use of GT Metrix in SIMPKB performance testing will provide an accurate picture of the extent to which the system is able to provide a fast and efficient response to users. Furthermore, the results of this performance analysis using GT Metrix will provide a concrete basis for improvement and optimization recommendations (Dawis & Setiawan, 2022). Thus, it can assess the extent to which SIMPKB is able to overcome challenges in managing data and user needs effectively. Meanwhile, evaluating efficiency from a user perspective will involve tracing the user's experience in interacting with SIMPKB. Aspects such as interface clarity, information readability, and user convenience will be the focus in evaluating the efficiency of the system from a practical point of view. Based on the aforementioned statement, the research question posed by the researcher is: "What are the performance and usability challenges faced by the SIMPKB website, and how can they be mitigated to enhance the user experience?" Through a comprehensive analysis of SIMPKB's performance and efficiency, this study aims to gain a deeper understanding of the role of technology in advancing teacher professional development. The anticipated findings of this research are expected to offer valuable insights for the continued enhancement of similar systems and to serve as a foundation for refining education policies and practices.

*name of corresponding author

LITERATURE REVIEW

Several studies have provided quite meaningful views. Aisyah et al., (2021) Highlights the need for improvements to the website to increase acceptance rates. This shows awareness of the importance of website quality in meeting user expectations and needs. Hajizah (2024) More emphasis is placed on user experience in interface design, acknowledging that this aspect has a significant impact on the usability of the system. By prioritizing user experience, input errors can be minimized, and user satisfaction can be improved. This approach reflects a shift in focus to the human aspect of technology development.

Rizki & Dewi (2022) Highlighting the impact of technological advances on people's lives as a whole. These changes cover a wide range of sectors, signifying that technological developments not only impact specific areas, but also create broader transformations in society. The role of internet technology, especially through smartphones, in changing the way we access information and communicate (Prihatmojo & Badawi, 2020; Silalahi & Budiono, 2023). With the ease of access and sophisticated features on smartphones, the digital world is increasingly open and affordable for the public (Prihatmojo & Badawi, 2020; Silalahi & Budiono, 2023). Prihatmojo & Badawi (2020) highlighting the ease of internet access via smartphones. Silalahi & Budiono (2023) Emphasizes the use of web-based technology to increase interactivity in the learning process.

Overall, this reflects the need for improvements and improvements in website development, technology empowerment in everyday life, and an understanding of the role of web-based innovation in modern learning. These findings become the basis for researchers for further development in various fields, in this case, this research is in the field of management information systems based on the SIMPKB website related to technological advances and website use.

METHOD

This research carries a qualitative descriptive approach with the aim of deeply understanding the performance and usability of the SIMPKB website. This research consists of two complementary stages, the first involves performance testing using GT Metrix software, and the second phase focuses on in-depth interviews with 5 driving teachers in Jember Regency by applying the concept of the Five Dimensions of Usability (5E) model. The first stage, performance testing using GT Metrix, was designed to investigate the technical aspects of the SIMPKB website. This process involves measuring website performance and evaluating improvement suggestions provided by GT Metrix. The results of this stage will give you an in-depth picture of the technical efficiency and overall performance of the website. The second stage involves in-depth interviews with 5 mobilizing teachers, adopting the concept of the 5E model to evaluate the usability dimension. These mobilizing teachers were selected efficiently by considering the variability of responses using SIMPKB without spending a lot of money. In-depth interviews will discuss aspects of effectiveness, efficiency, engagement, fault tolerance, and ease of learning from the user's perspective. The selection of 5 mobilizing teachers was carried out carefully to ensure representativeness in responding to variations in the use of SIMPKB. This decision is based on considerations of efficiency and the ability to represent the spectrum of user responses.

The entire research step will be carried out by maintaining a high level of ethics and data confidentiality to protect the identity and privacy of respondents. This research is expected to provide a holistic understanding of the performance and usability of the SIMPKB website, integrating technical analysis with qualitative evaluation from the user's perspective. The findings of this study are expected to contribute to the further development of SIMPKB as well as provide a foundation for improvements in education policies and practices.
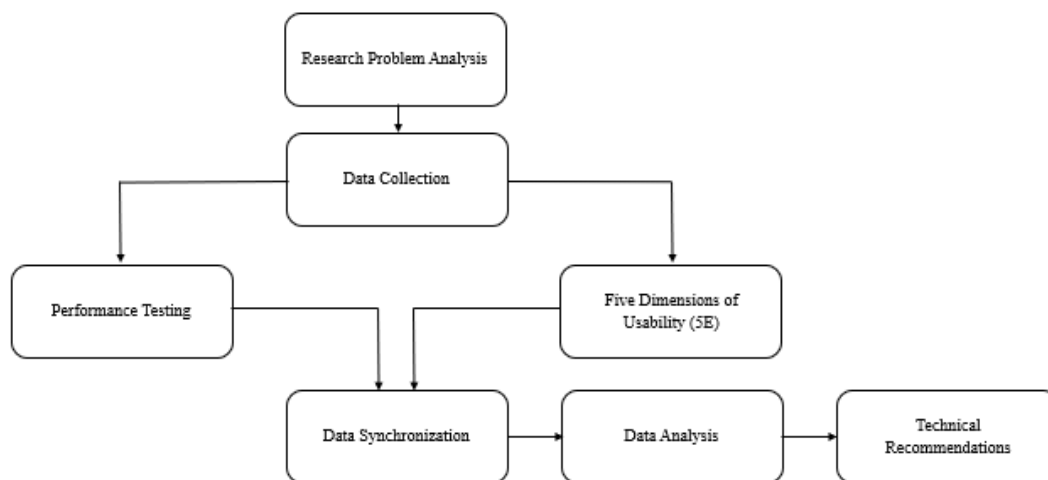
**Figure 1.** Research Model
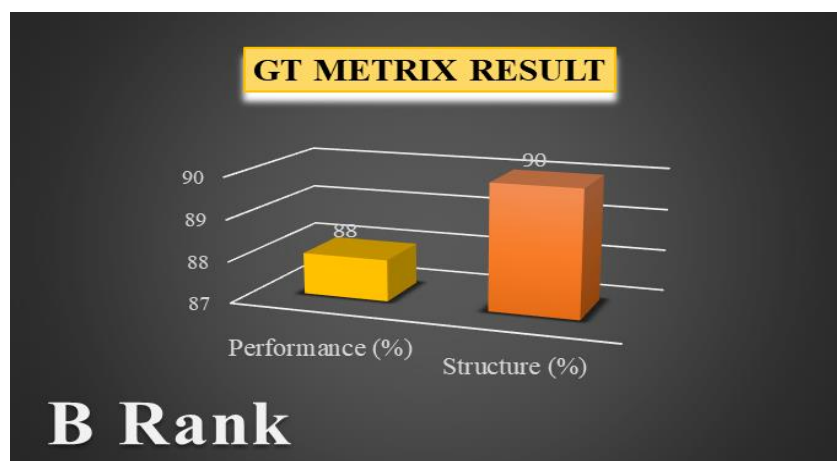
*name of corresponding author

RESULT

Performance Test

The performance test was conducted in Jember Regency, ensuring a stable internet connection for website access. It was carried out during daylight hours, anticipating a significant influx of SIMPKB users, aimed at evaluating the website's stability during peak traffic periods. GT Metrix software was employed for the test due to its capacity to provide comprehensive insights into performance metrics. GT Metrix was specifically chosen for its capability to offer improvement recommendations based on test results, a feature that will be further expounded upon by the researcher.
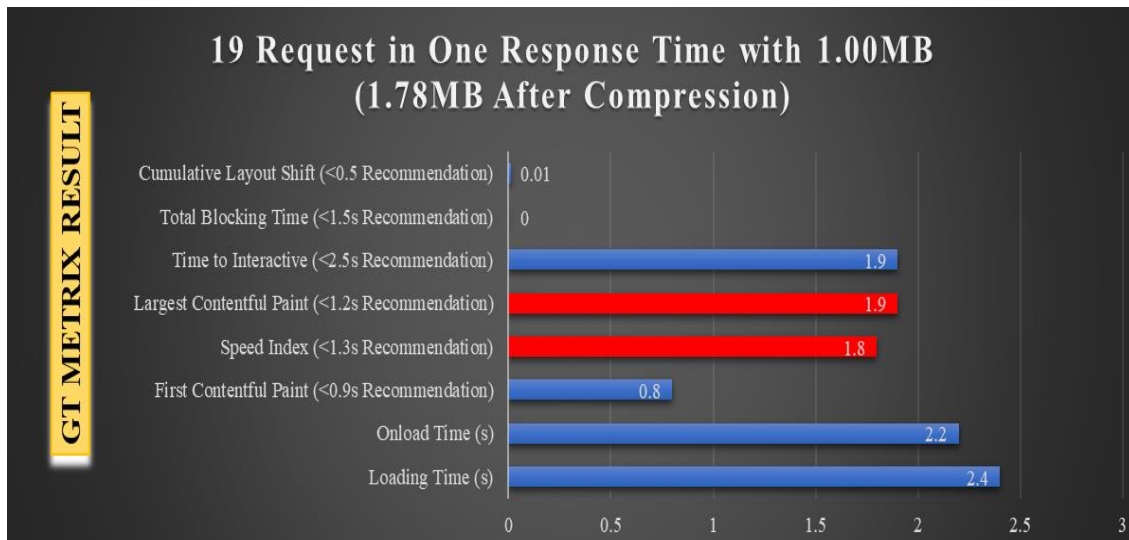
Figure 2. Performance Metrics SIMPKB Website

Figure 2 illustrates a graph depicting the response speed of the SIMPKB website. Analysis results indicate that the dapodik website exhibits a response speed of up to 19 requests with a total page size of 1.00MB (1.78MB after compression), achieving a loading time of approximately 2.4 seconds, with an onload time of about 2.2 seconds. These metrics convey critical insights regarding website performance. A relatively low number of requests suggests efficient resource management, while the total page size reflects the complexity of user-facing content. Loading speed and onload times serve as pivotal indicators for assessing user access and interaction efficiency with various website elements. It is imperative to note that these findings offer valuable guidance for SIMPKB website developers to enhance performance and user experience. Notably, the Speed Index attained a score of 1.8 seconds, slightly exceeding the recommended threshold of 1.3 seconds by GT Metrix for optimal user experience in visually accessing page content. Additionally, a suboptimal score was observed in the Largest Contentful Paint, recording 1.9 seconds, surpassing the suggested 1.2 seconds for displaying the largest content elements, such as the main image, on the page. This data provides significant insights into website performance, pinpointing areas necessitating attention to improve response speed and overall user experience.

Figure 3. Overall Result SIMPKB Website

*name of corresponding author

Figure 3 shows the Overall Results of the SIMPKB Website, where based on the test results using GT Metrix, SIMPKB is given a B grade with a performance score of 88% and a structure of 90%. In this assessment, special attention was paid to the Largest Contentful Paint (LCP) factor, which received a score of 1.9 seconds in figure 2 . A performance rating of 88% reflects generally good performance, however, it is worth noting that improvements may be possible. The LCP factor with a value of 1.9 seconds in figure 2 indicates a rather slow time to display the largest content element on the page. Based on the previously mentioned results, GT Metrix's recommendation suggests improvements by providing explicit dimensions to image elements.

Table 1. Suggestions for Improving SIMPKB Website Based on GT Metrix

Audit Item	Impact	Potential Savings
Low Serve images in next-gen formats	Low	199KB
Low Eliminate render-blocking resources	Low	37ms
Low Reduce unused JavaScript	Low	152KB
Low Avoid enormous network payloads	Low	Total size: 1.00MB
Low Ensure text remains visible during webfont load	Low	1 font found
Low Avoid long main-thread tasks	Low	1 long task found
Low Reduce unused CSS	Low	68.6KB
Low Reduce initial server response time	Low	Root document: 199ms
Low Defer offscreen images	Low	68.2KB
Low Avoid chaining critical requests	Low	8 chains found

Table 1 shows various suggestions for improvements to improve the overall performance and quality of the SIMPKB website. Based on the analysis conducted using GT Metrix, several recommendations have been provided to enhance the performance of the SIMPKB website. Firstly, it is suggested to serve images in next-gen formats, which could potentially lead to savings of 199KB in page size. Secondly, eliminating render-blocking resources is advised, with a potential reduction in loading time by 37ms. Additionally, reducing unused JavaScript and CSS is recommended, potentially saving 152KB and 68.6KB, respectively, in page size. Moreover, efforts should be made to avoid enormous network payloads, as the total size of the page was reported to be 1.00MB. Ensuring that text remains visible during webfont load is also highlighted as an area for improvement, with one font identified during the audit. Additionally, addressing long main-thread tasks and deferring offscreen images could contribute to optimizing the website's performance, potentially saving 68.2KB. Lastly, it is suggested to avoid chaining critical requests, as eight chains were identified during the analysis. These recommendations provide valuable insights for website developers and managers, facilitating the enhancement of the SIMPKB website's performance and user experience.

Five Dimensions of Usability (5E)
The evaluation of the SIMPKB website through the Five Dimensions of Usability (5E) framework provides valuable insights into various aspects of usability. Participants were gathered in one location in the Jember regency to optimize time and cost efficiency. Each participant was allotted a 20-minute time slot to answer all posed questions. To uphold privacy, researchers ensured the confidentiality of any information that could potentially disrupt participants' personal and professional lives. This approach aimed to create a conducive environment for open and honest feedback while safeguarding the privacy of the participants. This assessment was conducted by conducting an in-depth interview related to the 5E dimension with the question *"How is your experience as a SIMPKB user in terms of effectiveness, efficiency, engagement, errors, and ease of learning, and are there any specific suggestions you can give to improve the use of SIMPKB?".* The results have been summarized and can be seen in table 2.

Table 2. Results of Five Dimensions of Usability Interview on SIMPKB Website

Mobilizing Teachers	Result
Mobilizing Teachers 1	*"My experience with SIMPKB reflects a high level of effectiveness due to the ease of accessing and managing professional data. However, there are some obstacles related to loading which is a bit slow, especially when accessing pages with a lot of data. My suggestion is to increase page loading speed to minimize disruption in daily use."*

*name of corresponding author

Mobilizing Teachers	Result
Mobilizing Teachers 2	*"I feel SIMPKB provides a fairly efficient user experience, especially in terms of information accessibility and data retrieval. However, there are some minor issues related to the layout that can be confusing at times, especially when accessing new features. My suggestion is to simplify the user interface to increase clarity and minimize the chance of errors."*
Mobilizing Teachers 3	*"The use of SIMPKB has provided good efficiency in professional management. I found a sufficient level of engagement, but there are still some minor errors related to data updates that are sometimes not recorded correctly. My suggestion is to improve the accuracy of data updates so that the information presented is always accurate and up-to-date."*
Mobilizing Teachers 4	*"In general, SIMPKB provides a fairly effective and efficient experience. I feel well engaged, but sometimes get mistakes when uploading documents related to the profession. My suggestion is to improve the document upload process to avoid errors and ensure data integrity."*
Mobilizing Teachers 5	*"I consider SIMPKB to be quite effective and efficient in professional management. The engagement rate of using this platform is quite good, however, there are some navigation-related errors that can make the process less smooth. My suggestion is to improve navigation so that users can interact more easily and efficiently."*

The interview results regarding the SIMPKB platform using the five dimensions of usability (5E) framework indicate that while the platform is effective and efficient in professional management, there are several issues that need addressing. Users appreciate the ease of data access and management but express concerns about slow page loading speed, occasionally confusing layout, inaccuracies in data updates, document upload issues, and navigation difficulties. Suggestions for improvement include enhancing page loading speed, simplifying the user interface, ensuring data update accuracy, refining the document upload process, and improving navigation to enhance overall user experience.

DISCUSSIONS

The results of performance testing and Five Dimensions of Usability (5E) interviews on the SIMPKB website provide a thorough understanding of the platform's user experience and technical performance. In combining the results of the two tests, a more comprehensive picture of the challenges and potential improvements that can be taken is drawn. In terms of performance, Figure 1 and Figure 2 reveal the relatively good response speed of the SIMPKB website, although there are some areas that can be improved, such as loading times and Largest Contentful Paint (LCP). While still achieving good performance scores, increasing response speed will have a positive impact on the efficiency of daily use. The proposed improvement suggestions in Figure 4 provide concrete directions for addressing technical constraints that might affect performance.

The 5E interview results and overall website performance test results in Figure 3 reflect an in-depth evaluation of the effectiveness, efficiency, engagement, errors, and ease of learning on the platform. The mobilizing teacher provides valuable perspectives on the advantages and disadvantages of SIMPKB, including specific suggestions for improving usability. The combination of findings from performance testing and 5E interviews provides a holistic picture of the condition and potential improvement of the SIMPKB website. It is important to note that the findings of these two approaches complement each other. Improved technical performance, especially in terms of response speed, can directly affect user effectiveness and efficiency (Aisyah et al., 2021; Hajizah, 2024). Improvement suggestions from mobilizing gurus, which focus more on the usability aspect, can increase engagement and minimize potential user error. Therefore, the integration of recommendations from both tests can create a better user experience across the board. Improvement and optimization of the SIMPKB website can include a combined strategy that includes improving technical performance and improving usability.

By adopting proposed improvement suggestions and responding proactively to mobilizing teacher feedback, SIMPKB can continue to evolve as an effective, efficient, and easy-to-use platform for teacher professional management (Permata et al., 2024; Purnama, 2021; Wiradimadja et al., 2021).

CONCLUSION

The research resulted in a thorough understanding of the performance and usability of the SIMPKB website, highlighting the relatively good response speed but with several areas of improvement found. The integration of performance testing results and 5E interviews provides a holistic picture of the condition and potential for improvement. Proposed improvement suggestions, especially in improving response speed and optimizing usability, can be adopted to improve user experience. Further research recommendations include further exploration of technical performance optimization, implementation of more intuitive interface design, and evaluation of the impact of implementing improvements on user effectiveness. This further research can provide an in-depth look at the evolution of the SIMPKB platform and support the development of similar systems.

REFERENCES

Aisyah, R., Istiqomah, D., & Muchlisin, M. (2021). Rising English Students' Motivation in Online Learning Platform: Telegram Apps Support. *Utamax : Journal of Ultimate Research and Trends in Education*, *3*, 90–96. https://doi.org/10.31849/utamax.v3i2.6464

Bangsawan, G. (2023). Kebijakan Akselerasi Transformasi Digital di Indonesia: Peluang dan Tantangan untuk Pengembangan Ekonomi Kreatif. *Jurnal Studi Kebijakan Publik*, *2*(1), Article 1. https://doi.org/10.21787/jskp.2.2023.27-40

Dawis, A. M., & Setiawan, I. (2022). Evaluation of The Website 'Aisyiyah Surakarta of University Performance Based on Search Engine Optimization Using Automated Software Testing Gtmetrix. *International Journal of Computer and Information System (IJCIS)*, *3*(1), Article 1. https://doi.org/10.29040/ijcis.v3i1.56

Djusar, S., Asril, E., & Anggraini, K. (2023). Pemanfaatan Akun Belajar.id bagi Guru SMPN Binaan Khusus Kota Dumai | Wikrama Parahita: Jurnal Pengabdian Masyarakat. *Wikrama Parahita : Jurnal Pengabdian Masyarakat*, *7*(1), 111–116. https://doi.org/10.30656/jpmwp.v7i1.5400

Gill, S. S., Xu, M., Ottaviani, C., Patros, P., Bahsoon, R., Shaghaghi, A., Golec, M., Stankovski, V., Wu, H., Abraham, A., Singh, M., Mehta, H., Ghosh, S. K., Baker, T., Parlikad, A. K., Lutfiyya, H., Kanhere, S. S., Sakellariou, R., Dustdar, S., … Uhlig, S. (2022). AI for next generation computing: Emerging trends and future directions. *Internet of Things*, *19*, 100514. https://doi.org/10.1016/j.iot.2022.100514

Hajizah, A. (2024). Penerapan User Experience Dalam Permodelan Sistem Informasi Keuangan. *Journal of Information Technology, Software Engineering and Computer Science*, *2*(1), Article 1. https://doi.org/10.58602/itsecs.v2i1.88

Harsono, H. (2022). Faktor-Faktor Yang Mempengaruhi Sistem Informasi Berbasis Komputer: Sistem Operasi, Server, dan Programmer (Literature Review Executive Support Sistem For Business). *Jurnal Manajemen Pendidikan Dan Ilmu Sosial*, *3*(2), 583–593. https://doi.org/10.38035/jmpis.v3i2.1121

Hartatik, H., Rukmana, A. Y., Efitra, E., Mukhlis, I. R., Aksenta, A., Ratnaningrum, L. P. R. A., & Efdison, Z. (2023). *Tren Technopreneurship: Strategi & Inovasi Pengembangan Bisnis Kekinian dengan Teknologi Digital*. PT. Sonpedia Publishing Indonesia.

Hasanah, D., Samsudi, S., Khafid, M., & Mahmud, A. (2023). Vocational High School Teachers Continuous Professional Learning. *International Conference on Science, Education, and Technology*, *9*, 176–183.

Nipriansyah, N., Danim, S., Kartiwi, A. P., & Susanto, E. (2022). The Effectiveness of the Basic Level of Combination Online Education and Training for Early Childhood Education Teachers. *International Journal of Multicultural and Multireligious Understanding*, *9*(1), Article 1. https://doi.org/10.18415/ijmmu.v9i1.3302

Novelita, N., Devian, L., Sufyarma, S., & Rifma, R. (2023). Strategi Pengembangan Profesionalisme Guru dalam Konteks Manajemen Berbasis Sekolah Dasar di Era Digital. *Modeling: Jurnal Program Studi PGMI*, *10*(3), Article 3. https://doi.org/10.36835/modeling.v10i3.1673

Permata, D., Sodikin, Santoso, G., Guntur, M., & Juryati. (2024). Peningkatan Pemahaman Nilai Tempat pada Siswa Kelas 3 Melalui Pendekatan Pembelajaran Matematika Interaktif. *Jurnal Pendidikan Transformatif*, *3*(1), Article 1. https://doi.org/10.9000/jpt.v3i1.1133

Prihatmojo, A., & Badawi, B. (2020). Pendidikan Karakter di Sekolah Dasar Mencegah Degradasi Moral di Era 4.0. *Dwija Cendekia: Jurnal Riset Pedagogik*, *4*(1), Article 1. https://doi.org/10.20961/jdc.v4i1.41129

*name of corresponding author

Purnama, M. (2021). Implementasi Program Peningkatan Kompetensi Pembelajaran (Pkp) Berbasis Zonasi Untuk Guru Pada Jenjang Smp. *Educational: Jurnal Inovasi Pendidikan & Pengajaran*, *1*(2), Article 2. https://doi.org/10.51878/educational.v1i2.182

Puspitasari, M. (2022). Supervisi Akademik Dalam Meningkatkan Kompetensi Pedagogik Guru Smp Negeri 3 Pante Bidari Aceh Timur. *Academia: Jurnal Inovasi Riset Akademik*, *2*(3), Article 3. https://doi.org/10.51878/academia.v2i3.1473

Pustikayasa, I. M., Permana, I., Kadir, F., Zebua, R. S. Y., Karuru, P., Husnita, L., Pinatih, N. P. S., Indrawati, S. W., Nindiati, D. S., Yulaini, E., & Suryani, I. (2023). *Transformasi Pendidikan: Panduan Praktis Teknologi di Ruang Belajar*. PT. Sonpedia Publishing Indonesia.

Rachmi, Surachman, A., Putri, D. E., Nugroho, A., & Salfin. (2024). Transformasi Pendidikan di Era Digital Tantangan dan Peluang. *Journal of International Multidisciplinary Research*, *2*(2), Article 2. https://doi.org/10.62504/6y4qb169

Rambung, O. S., Sion, S., Bungamawelona, B., Puang, Y. B., & Salenda, S. (2023). Transformasi Kebijakan Pendidikan Melalui Implementasi Kurikulum Merdeka Belajar. *JIP: Jurnal Ilmu Pendidikan*, *1*(3), Article 3.

Rizki, T. Z. S., & Dewi, D. S. (2022). Analisis User Experience Website E-Government dengan Mempertimbangkan Aspek Pragmatis Dan Hedonis (Studi Kasus: Sipemuda Kubu Raya). *Jurnal Teknik ITS*, *11*(3), A223–A229. https://doi.org/10.12962/j23373539.v11i3.97124

Said, S. (2023). Peran Teknologi Digital Sebagai Media Pembelajaran di Era Abad 21. *Jurnal PenKoMi : Kajian Pendidikan Dan Ekonomi*, *6*(2), Article 2. https://doi.org/10.33627/pk.62.1300

Saifulloh, A. M., & Darwis, M. (2020). Manajemen Pembelajaran dalam Meningkatkan Efektivitas Proses Belajar Mengajar di Masa Pandemi Covid-19. *Bidayatuna Jurnal Pendidikan Guru Mandrasah Ibtidaiyah*, *3*(2), Article 2. https://doi.org/10.36835/bidayatuna.v3i2.638

Sarita, K., Kaur, P., & Kaur, S. (2022). Accessibility and Performance Evaluation of Healthcare and E-Learning Sites in India: A Comparative Study Using TAW and GTMetrix. In B. Iyer, T. Crick, & S.-L. Peng (Eds.), *Applied Computational Technologies* (pp. 172–187). Springer Nature. https://doi.org/10.1007/978-981-19-2719-5_16

Setiawati, R., Yolandha, W., & Herlambang, Y. T. (2023). Transformasi Teknologi Dalam Pendidikan di Era Revolusi Industri 4.0: Dilema Teknologi Dalam Perspektif Filosofis. *Cendikia: Jurnal Pendidikan Dan Pengajaran*, *1*(5), Article 5. https://doi.org/10.572349/cendikia.v1i5.644

Silalahi, R. B., & Budiono, H. (2023). Pengembangan Bahan Ajar Flipbook Berbasis Web pada Muatan IPA di Sekolah Dasar. *Journal of Education Research*, *4*(3), Article 3. https://doi.org/10.37985/jer.v4i3.414

Widyawati, E. R., & Sukadari, S. (2023). Pemanfaatan Media Pembelajaran Berbasis Teknologi sebagai Alat Pembelajaran Kekinian bagi Guru Profesional IPS dalam Penerapan Pendidikan Karakter Menyongsong Era Society 5.0. *Proceedings Series on Social Sciences & Humanities*, *10*, 215–225. https://doi.org/10.30595/pssh.v10i.667

Wiradimadja, A., Ratnawati, N., Kurniawan, B., Yaniafari, R., & Alivi, J. (2021). Screen Recorder for Guiding Distance Learning: Case Study of Teacher Professional Education Program. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(7), 4–15. https://doi.org/10.3991/ijet.v16i07.21173

Zulfa, G. I. (2024). Implementasi Sistem Informasi dalam Manajemen Pendidikan Di SDIT Indra Bangsa. *INTIFA: Journal of Education and Language*, *1*(1), Article 1. https://doi.org/10.62083/p08av427

*name of corresponding author