

Exploring the Digital Transformation of Physical Education: User Perceptions and Supporting Resources

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Abstract

This study aims to analyze the perceptions of lecturers and students regarding the ease of use of digital platforms in the teaching of Physical Education, Sports, and Health (PJOK). The study is motivated by the growing utilization of digital technology in higher education, particularly in the post-pandemic era that has accelerated the adoption of online and hybrid learning systems. A descriptive quantitative approach was employed, with data collected through questionnaires distributed to respondents who had experience using platforms such as LMS, Zoom, and Google Classroom. The findings reveal that the majority of respondents rated digital platforms as “very easy” (53%) and “easy” (40.9%) to use in PJOK learning activities. However, 12.1% of respondents reported experiencing difficulties, which may be attributed to limited digital literacy, technical barriers, or a mismatch between platform features and the practical nature of PJOK instruction. These findings suggest that although the digitalization of PJOK learning has progressed positively, strategic interventions are still needed, including technical training, device support, and the development of adaptive digital learning models, to ensure that the digital transformation process is inclusive, effective, and sustainable.

Keyword: Digital Learning, Physical Education, User Perception, Higher Education, and Educational Technology

INTRODUCTION

The advancement of digital technology has brought about significant changes in the field of education, including at the higher education level (Díaz-Suárez et al., 2025). Traditional forms of instruction are gradually being replaced by more modern approaches that utilize digital tools



to support the teaching and learning process (Ocen et al., 2025). This transformation is not limited to theoretical courses but has also extended to practical courses such as Physical Education, Sports, and Health (PJOK). In this context, the integration of digital technology presents both challenges and opportunities for enhancing the effectiveness and efficiency of PJOK instruction in institution (Martín-Rodríguez & Madrigal-Cerezo, 2025).

The digitalization of education demands the availability of various supporting infrastructures, including teaching devices (e.g., computers, laptops, projectors, and wearable devices), stable internet connectivity, and digital platforms (e.g., Learning Management Systems, interactive learning applications, and online communication tools). The availability of these facilities is a critical factor in ensuring the smooth implementation of technology-based learning, especially in PJOK courses, which require a combination of theoretical knowledge and field-based practical activities (Zou et al., 2025). However, the implementation of such systems often reveals a gap between the ideal requirements and the actual conditions on the ground, particularly in terms of infrastructure and human resource readiness (Subroto et al., 2023).

In addition to infrastructure, user perceptions—both among lecturers and students—play a significant role in the success of educational digitalization (Suwahyu, 2024). These perceptions include ease of use, comfort in online interactions, and the level of student engagement in technology-enhanced learning environments (Maiti & Priyaadharshini, 2024). When both lecturers and students find the technology accessible and user-friendly, the learning process tends to be more effective and interactive. Conversely, if technology is perceived as difficult or burdensome, it may hinder rather than support the teaching and learning process (Budiyo & Haerullah, 2024).

In the context of PJOK courses, digitalization presents unique challenges. These courses emphasize physical activity, motor coordination, and social interaction, which typically take place in open spaces or outdoor fields (Culajara, 2023). Consequently, adapting to digital technologies requires innovation in both instructional methods and learning media (Gutierrez et al., 2023). Tools such as video tutorials, physical activity tracking apps, and augmented reality are increasingly being explored as viable alternatives. However, the successful use of these technologies depends largely on the availability of appropriate facilities and users' understanding of their benefits and operational mechanisms (Limbong et al., 2023).

Institution play a strategic role in supporting digital transformation, including the provision of adequate infrastructure. Nevertheless, not all institution have the necessary resources to meet these demands optimally (Alenezi & Akour, 2023). Therefore, it is essential to conduct a thorough mapping and analysis of the available support facilities to ensure that efforts to enhance digital





PJOK instruction can be directed accurately and sustainably (Smith et al., 2023).

Based on this background, the present article aims to provide an overview of the availability of digital learning facilities, including teaching devices, internet connectivity, and digital platforms. In addition, this study explores the perceptions of both lecturers and students regarding the ease of use of digital platforms in PJOK instruction. The findings of this research are expected to offer valuable insights for higher education institutions in designing more inclusive, adaptive, and contextually relevant digital learning strategies, particularly in the field of physical education.

METHOD

This study employed a descriptive quantitative approach to obtain a general overview of the availability of digital support facilities and the perceptions of lecturers and students regarding the ease of use of digital platforms in the teaching and learning of Physical Education, Sports, and Health (PJOK). This approach was selected to analyze numerical data collected through a closed-ended questionnaire, with the results presented in the form of percentages, tables, and statistical descriptions.

This study was conducted at institution, specifically within study programs that offer courses in Physical Education, Sports, and Health (PJOK). The subjects of this research consisted of two groups of respondents: lecturers who teach PJOK courses and students enrolled in those courses. The selection of respondents was carried out using purposive sampling, targeting individuals who were directly involved in digitally-based PJOK learning activities.

The total number of respondents included both 198 lecturers and 2.123 students from various academic cohorts who were actively participating in PJOK courses during the current semester. All respondents had prior experience using digital devices, internet connectivity, and digital learning platforms throughout the teaching and learning process, whether conducted fully online or through a blended learning format.

RESULTS AND DISCUSSION

1. The Availability of Digital Support Facilities

The findings of this study aim to describe the availability of digital support facilities in the teaching and learning of Physical Education, Sports, and Health (PJOK) at institution. The main focus of the study covers three key aspects: the availability of teaching devices, internet connectivity, and digital platforms. Data were collected through questionnaires distributed to both lecturers and students, and the results were analyzed and presented in bar chart format to



provide a clear visualization of the actual conditions in the field.

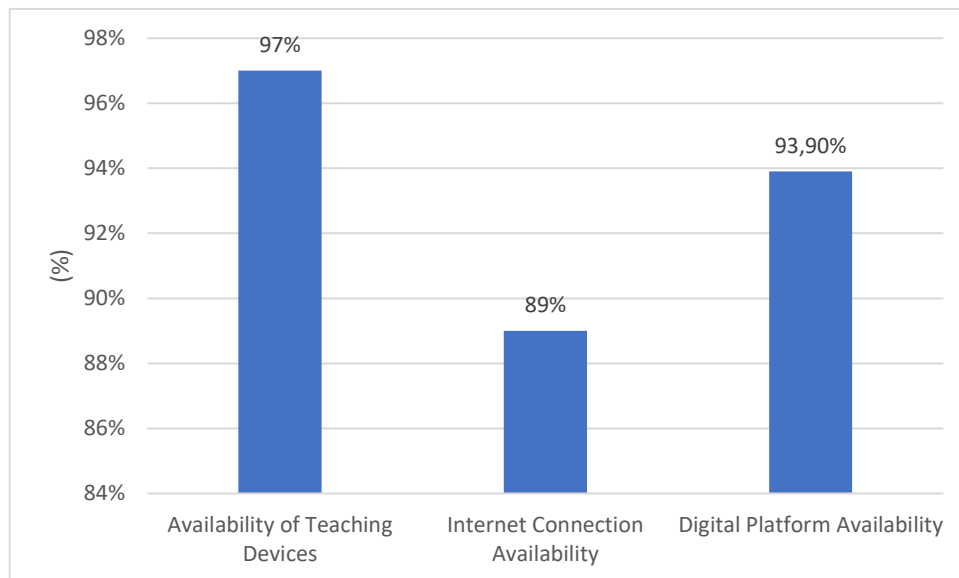


Figure 1. Availability of Digital Support Facilities in Learning

Based on the research data, the availability of teaching devices showed the highest level, reaching 96.7%. This indicates that, in general, lecturers have access to teaching tools such as laptops, projectors, cameras, and other supporting equipment. This finding reflects a high level of readiness in terms of hardware provision to support the digitalization of PJOK learning. The availability of adequate devices forms a crucial foundation for ensuring the continuity and effectiveness of technology-based learning processes, especially when theoretical and practical components are integrated in a blended learning system.

On the other hand, the aspect of internet connectivity availability recorded the lowest percentage, at 89.7%. Although this figure still falls into a high category, it suggests that issues related to the quality and stability of internet networks remain a concern for both lecturers and students. Given the heavy reliance on internet access in online learning, this factor is critical. Poor connectivity or limited bandwidth can lead to delayed access to materials, hindered communication, and reduced effectiveness in online interaction. Therefore, despite the adequacy of teaching devices, improvements in internet infrastructure remain an urgent necessity.

The aspect of digital platform availability reached 94.1%, indicating that most lecturers and students have access to various online learning platforms. Platforms such as Learning Management Systems (LMS), Google Classroom, Zoom, and other digital tools have become part

of the regular teaching routine. The ease of access and familiarity with these platforms signal that the adaptation process to digital learning has progressed well. Nevertheless, the success of digital platform use is not solely determined by availability, but also by users' perceptions of ease and comfort, which are further discussed in the section on user perceptions.

Overall, the results of this study demonstrate that the digitalization of PJOK learning at institution is generally well-supported by available facilities, particularly in terms of devices and platforms. However, the main challenge lies in the suboptimal condition of internet connectivity. Therefore, systematic efforts from the institution are required to improve network quality and provide technical support to users, ensuring that the implementation of digital-based learning can be carried out optimally and sustainably.

2. User Response to the Digital Platform used

The figure above presents data on user responses regarding the ease of use of digital platforms in the learning process of Physical Education, Sports, and Health (PJOK). The respondents in this study consisted of lecturers and students who had utilized various digital platforms, such as Learning Management Systems (LMS) and other similar tools throughout the learning process.

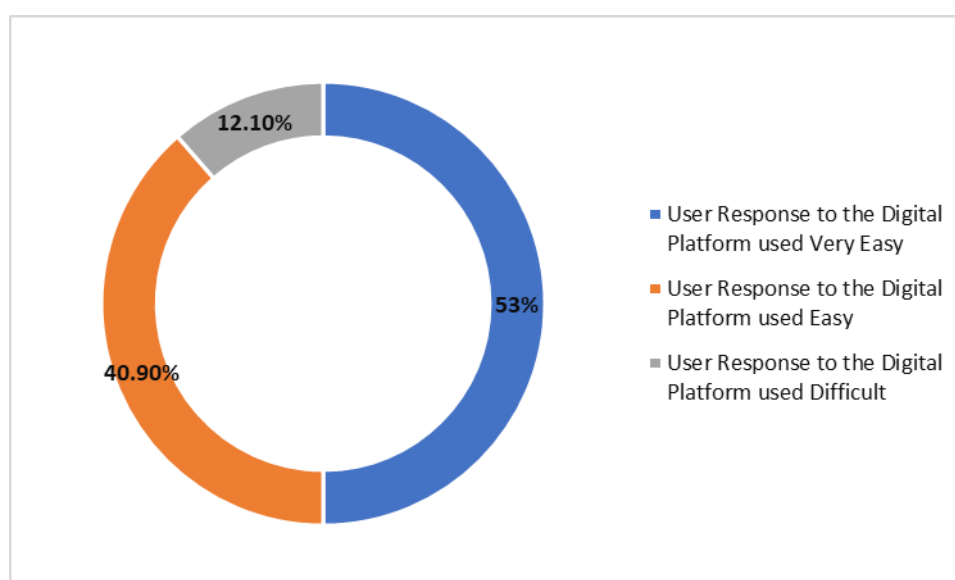


Figure 2. Availability of Digital Support Facilities in Learning

The chart indicates that the majority of respondents rated digital platforms as "very easy to use," with a proportion of 53%. This finding reflects a high level of user familiarity and comfort



in operating digital platforms for educational purposes. In addition, 40.9% of respondents reported that the platforms were "easy to use." Although this suggests that some minor challenges may still exist, most users were able to access and navigate the platforms relatively easily and without significant obstacles. However, 12.1% of respondents stated that the platforms were "difficult to use." This percentage indicates that a small portion of users may encounter technical difficulties, limited digital literacy, or a mismatch between platform features and the practical nature of PJOK learning.

Overall, these findings suggest that the transition to digital-based learning in the PJOK course has been implemented effectively. Nevertheless, more targeted interventions—such as technical training and digital support—are necessary to assist the group of users who continue to face difficulties in accessing or utilizing the digital learning platforms optimally.

DISCUSSION

The data revealed that the majority of respondents, including both lecturers and students, perceived the use of digital platforms in Physical Education (PJOK) learning as very easy (53%) and easy (40.9%). This high percentage indicates that the adoption of technology in the learning process has been widely accepted by most users (Yekimov et al., 2023). It also reflects the institution's success in providing access and basic training on digital platforms such as Learning Management Systems (LMS), Zoom, and Google Classroom, which have become widely known and utilized in higher education environments (Binhammad et al., 2024).

The high level of user comfort may also be associated with the increased digital literacy resulting from the extensive implementation of online learning during the COVID-19 pandemic (Reyes-Millán et al., 2023). Previous experiences with remote learning likely enhanced the technical competencies of both students and lecturers, thus facilitating a smoother transition to blended or fully digital learning models (Tosto et al., 2023). This suggests that both the infrastructure and human resources are relatively prepared for this paradigm shift in education (Syahrin et al., 2023).

Nevertheless, the fact that 12.1% of respondents still reported difficulties in using digital platforms points to remaining challenges in the digital transformation process. This group may include individuals who experience limited access to technology, insufficient digital skills, or psychological barriers such as resistance to change (Valtonen & Holopainen, 2025). This is a critical concern, as the success of digital learning implementation depends heavily on the full participation of all stakeholders involved. To address this, educational institutions need to





enhance the availability of technical support and conduct training programs tailored to the specific needs of different user segments (Alenezi, 2023).

The mismatch between digital platform features and the practical nature of PJOK learning could also contribute to these difficulties. PJOK learning typically involves direct physical activity, observation of motor skills, and performance-based assessments (Yansa et al., 2023). As such, platforms that are predominantly theoretical or text-based may not be optimal unless complemented with suitable instructional strategies, such as video tutorials, virtual simulations, or wearable technology integration (Mohammad & Boushehry, 2023).

Furthermore, the perceived ease of use does not automatically guarantee increased learning effectiveness (Song et al., 2023). It is crucial to evaluate whether the use of digital platforms contributes to a deeper understanding of the material, increased student engagement, and improved learning outcomes (Adeoye & Akinnubi, 2023). Quantitative and qualitative assessments are needed to examine the impact of digital technology on student achievement, motivation, and satisfaction in the PJOK setting.

To address this gap, educational institutions should implement more targeted interventions, including regular technical training, technical support services, and the development of a digital curriculum tailored to the specific characteristics of PJOK learning. Additionally, involving lecturers in the evaluation and development of digital platforms is essential to continuously improve the user experience (El-Hamamsy et al., 2023). Such an approach is expected to ensure that the digital transformation of PJOK learning is inclusive, effective, and sustainable.

CONCLUSION

Based on the findings, it can be concluded that the majority of lecturers and students at institution perceive the use of digital platforms in Physical Education, Sports, and Health (PJOK) learning as either "very easy" or "easy." This indicates that the process of digitalization in learning has been relatively effective and well-received by most users. Such positive reception is likely attributed to the increasing levels of digital literacy following the widespread implementation of online learning, as well as the availability of supporting platforms such as Learning Management Systems, Zoom, and Google Classroom, which are widely familiar within higher education environments.

Nevertheless, a small proportion of respondents (12.1%) reported difficulties in using digital platforms. This highlights that the digital transformation has not yet achieved full inclusivity. Contributing factors may include limited access to technology, inadequate digital





competencies, and a mismatch between the practical nature of PJOK learning—which emphasizes physical activities—and the predominantly theoretical or text-based features of most digital platforms. This condition underscores the need for further evaluation and the development of more adaptive and responsive digital learning strategies.

As a follow-up, this study recommends several strategic actions. First, further qualitative research is needed to explore in greater depth the specific barriers faced by users who encounter difficulties. Second, it is essential to develop contextually relevant and application-oriented digital PJOK learning models, such as the integration of instructional videos, interactive simulations, and wearable technology for physical activities. Third, higher education institutions should conduct regular evaluations of infrastructure readiness and human resource competencies to ensure the sustainability of digital transformation.

In addition, continuous technical training and accessible support services should be integral to capacity-building efforts. Finally, interdisciplinary collaboration among experts in educational technology, sports science, and informatics is crucial for designing digital solutions that are aligned with the unique demands of PJOK instruction. With a more holistic approach, the implementation of digital learning can be rendered not only effective but also inclusive, adaptive, and sustainable in the long term.

REFERENCE

- Adeoye, M. A., & Akinnubi, O. P. (2023). Integrating Interactive Learning Technologies into Traditional Teaching Methods for Private Higher Education Institutions. *Formosa Journal of Computer and Information Science*, 2(2), 223. <https://doi.org/10.55927/fjcis.v2i2.4113>
- Alenezi, M. (2023). Digital Learning and Digital Institution in Higher Education. *Education Sciences*, 13(1), 88. <https://doi.org/10.3390/educsci13010088>
- Alenezi, M., & Akour, M. (2023). Digital Transformation Blueprint in Higher Education: A Case Study of PSU. *Sustainability*, 15(10), 8204. <https://doi.org/10.3390/su15108204>
- Binhammad, M. H. Y., Othman, A., Abuljadayel, L., Mheiri, H. A., Alkaabi, M., & Almarri, M. (2024). Investigating How Generative AI Can Create Personalized Learning Materials Tailored to Individual Student Needs. *Creative Education*, 15(7), 1499. <https://doi.org/10.4236/ce.2024.157091>
- Budiyono, S., & Haerullah, H. (2024). Dampak Teknologi terhadap Pembelajaran di Abad 21. *TSAQOFAH*, 4(3), 1790. <https://doi.org/10.58578/tsaqofah.v4i3.3005>
- Culajara, C. J. (2023). Enhancing Students' Learning Performance in Physical Education Through the Use of a Mobile Application with Game-Based Learning Approach. *Physical Education*





- and Sports Studies and Research, 2(1), 1. <https://doi.org/10.56003/pessr.v2i1.178>
- Díaz-Suárez, V., Martín-Paciente, M., & Travieso, C. M. (2025). Exploring the Impact of Digital Platforms on Teaching Practices: Insights into Competence Development and Openness to Active Methodologies. *Applied System Innovation*, 8(3), 64. <https://doi.org/10.3390/asi8030064>
- El-Hamamsy, L., Monnier, E.-C., Avry, S., Chessel-Lazzarotto, F., Liégeois, G., Bruno, B., Zufferey, J. D., & Mondada, F. (2023). An adapted cascade model to scale primary school digital education curricular reforms and teacher professional development programs. *Education and Information Technologies*, 29(9), 10391. <https://doi.org/10.1007/s10639-023-12043-6>
- Gutierrez, A. T., Tabora, A. R., & Gama, J. L. (2023). Physical education teachers in times of pandemic. *Journal of Physical Education*, 34(1). <https://doi.org/10.4025/jphyseduc.v34i1.3411>
- Limbong, A. M., Putri, D. A. P., Mujiono, M., Casmat, M., & Soko, I. P. (2023). Student Response to the Use of Augmented Reality Media in the Circulatory System in Humans. *Jurnal Penelitian Pendidikan IPA*, 9(7), 5453. <https://doi.org/10.29303/jppipa.v9i7.3922>
- Maiti, M., & Priyaadharshini, M. (2024). Evaluation of the experiences of learners and facilitators with ICT within the realm of higher education. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2024.2355377>
- Martín-Rodríguez, A., & Madrigal-Cerezo, R. (2025). Technology-Enhanced Pedagogy in Physical Education: Bridging Engagement, Learning, and Lifelong Activity. *Education Sciences*, 15(4), 409. <https://doi.org/10.3390/educsci15040409>
- Mohammad, M., & Boushehry, H. R. (2023). The influence of using video media on basic movement skills in kindergarten. *Education and Information Technologies*, 28(8), 9635. <https://doi.org/10.1007/s10639-022-11511-9>
- Ocen, S., Elasu, J., Aarakit, S. M., & Olupot, C. (2025). Artificial intelligence in higher education institutions: review of innovations, opportunities and challenges. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1530247>
- Reyes-Millán, M., Villareal-Rodríguez, M., Murrieta-Flores, M. E., Bedolla-Cornejo, L., Vázquez-Villegas, P., & Membrillo-Hernández, J. (2023). Evaluation of online learning readiness in the new distance learning normality. *Heliyon*, 9(11). <https://doi.org/10.1016/j.heliyon.2023.e22070>
- Smith, G. A., Saputro, & Primajaya. (2023). Diagnosis of Physical Education Teachers Welcoming Industry 5.0 Using the TDC Method. <https://knepublishing.com/index.php/KnE->





Social/article/download/13443/21747

- Song, C., Helikar, R., Smith, W., & Helikar, T. (2023). Factors Influencing Instructors' Adoption and Continued Use of Computing Science Technologies: A Case Study in the Context of Cell Collective. *CBE—Life Sciences Education*, 22(3). <https://doi.org/10.1187/cbe.22-11-0239>
- Subroto, D. E., Supriandi, Wirawan, R., & Rukmana, A. Y. (2023). Implementasi Teknologi dalam Pembelajaran di Era Digital: Tantangan dan Peluang bagi Dunia Pendidikan di Indonesia. *Jurnal Pendidikan West Science*, 1(7), 473. <https://doi.org/10.58812/jpdws.v1i07.542>
- Suwahyu, I. (2024). PERAN INOVASI TEKNOLOGI DALAM TRANSFORMASI PENDIDIKAN ISLAM DI ERA DIGITAL. *REFERENSI ISLAMIKA Jurnal Studi Islam*, 2(2), 28. <https://doi.org/10.61220/ri.v2i2.003>
- Syahrin, S., Almashiki, K., & Alzaanin, E. (2023). The Impact of COVID-19 on Digital Competence. *International Journal of Advanced Computer Science and Applications*, 14(1). <https://doi.org/10.14569/ijacsa.2023.0140156>
- Tosto, S. A., Alyahya, J., Espinoza, V., McCarthy, K., & Tcherni-Buzzeo, M. (2023). Online learning in the wake of the COVID-19 pandemic: Mixed methods analysis of student views by demographic group. *Social Sciences & Humanities Open*, 8(1), 100598. <https://doi.org/10.1016/j.ssaho.2023.100598>
- Valtonen, A., & Holopainen, M. (2025). Mitigating employee resistance and achieving well-being in digital transformation. *Information Technology and People*, 38(8), 42. <https://doi.org/10.1108/itp-05-2024-0701>
- Yansa, N., Syafaruddin, S., & Yusfi, H. (2023). ANALYSIS OF PHYSICAL FITNESS AND ATTITUDE OF CONFIDENCE ON PJOK LEARNING OUTCOMES. *Journal Physical Education Health and Recreation*, 7(2), 92. <https://doi.org/10.24114/pjkr.v7i2.42480>
- Yekimov, S., Firsová, N., Tynnyi, V., Mashkova, I., Ищенко, Т. Н., Kuzmenko, D., & Belyakova, O. V. (2023). The use of digital technologies in physical education classes for students with a weakened state of health. *E3S Web of Conferences*, 420, 10041. <https://doi.org/10.1051/e3sconf/202342010041>
- Zou, Y. L., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1562391>

