Educia Journal

ISSN: (2988-019X)
Vol. 4 No. 1, 2026
Page: 137-156

Analysis of the Needs for Developing an Interactive Video-Based Learning Management System (LMS) in Physical Education Learning

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Article Info

Article History:

Received March 28, 2026
Revised April 20, 2026
Accepted: May 21, 2026

Keywords:

Interactive Video, Learning Management System, Physical Education.

Abstract

This study aimed to analyze the need for developing an interactive video-based Learning Management System (LMS) for Physical Education, Sports, and Health (PJOK) learning. The study used a quantitative descriptive design with survey and observation methods. The participants were 201 Grade VIII students, consisting of 98 males and 103 females aged 13 to 15 years, and one PJOK teacher. Data were collected using a student needs questionnaire and an observation sheet on school technology readiness. The questionnaire consisted of 18 items and showed excellent reliability with a Cronbach's Alpha value of 0.980. Data were analyzed using descriptive percentage analysis, while observation data were interpreted descriptively. The findings showed that students had strong needs for flexible learning access, mobile-based learning materials, instructional videos, independent practice guidance, and more engaging PJOK learning experiences. The highest needs appeared in independent practice outside school, mobile accessibility, flexible learning access, and preference for engaging learning experiences. Observation results showed that the school had adequate technological infrastructure, including computers, LCD projectors, internet access, digital communication platforms, cameras, and audio systems. However, the use of technology in PJOK learning remained limited, especially in instructional videos, interactive applications, motion analysis tools, digital feedback, and LMS integration. These findings indicate a clear gap between available technological facilities and their use in PJOK instruction. Therefore, an interactive video-based LMS is relevant as a complementary learning system that supports teacher instruction, strengthens students' independent practice, and improves learning flexibility in PJOK. Future development should prioritize simple, accessible, and practical first-stage features.

Introduction

The rapid development of digital technology has changed the direction of education at all levels, including the learning process in schools (Timotheou et al., 2023; Pettersson, 2021). Technology is no longer seen only as a supporting tool. It has become an important part of learning design, classroom interaction, assessment, and student engagement. The use of digital media, mobile devices, instructional videos, and Learning Management Systems (LMS) allows teachers to present materials in more flexible and accessible ways (Ulanday et al., 2021; Giguruwa et al., 2012; Furqon et al., 2023; Bradley, 2021). This condition aligns with the demand of 21st-century education, which encourages students to develop creativity,

DOI: https://doi.org/10.71435/738193

communication, collaboration, critical thinking, and independent learning through meaningful technology integration (Jojo' et al., 2024; Pujari, 2024; Zaky & Iriana, 2025; Kaur et al., 2016).

In the school context, digital learning has opened new opportunities for teachers to create learning experiences that are more interactive and student-centered. Students can access materials beyond classroom hours, repeat difficult content, communicate with teachers, and use digital platforms to support their learning process. Digital media also helps teachers provide learning resources that are more varied than conventional textbooks or verbal explanations (Mayer, 2003; Kempe & Grönlund, 2019; Cabellos et al., 2023; Červenková et al., 2023). This is important because students today are closely connected to smartphones, internet access, social media, and digital content in their daily lives. Learning that ignores this reality may become less relevant to students' learning habits and digital experiences (Yadav, 2024; Shoily, 2024; Sinaga, 2025; Raffiedi et al., 2023).

Physical Education, Sports, and Health, or PJOK, has specific learning characteristics because it combines knowledge, movement skills, physical activity, and health values. PJOK learning does not only require students to understand concepts. It also requires them to observe, imitate, practice, correct, and repeat movement techniques. In many schools, PJOK learning still depends strongly on teacher demonstrations and direct practice in the field. This approach remains important because students need real movement examples. However, direct demonstration alone may not be enough when students need to review movements after class, practice independently, or understand movement details more carefully (Hodges & Franks, 2002). Visual learning support is highly relevant because movement skills require clear examples, repeated observation, and practical guidance (Budiarsa et al., 2024; Purnamaningsih et al., 2025; Febriyanto, 2024; Ishak et al., 2025).

The integration of technology in PJOK learning still faces several problems. Digital media is often considered less urgent in physical education than in classroom-based subjects (Ha et al., 2025; Uibu et al., 2022). As a result, PJOK learning often remains conventional, with limited use of videos, LMS platforms, interactive media, and digital feedback tools. This situation can reduce learning variation and limit student access to materials outside school hours. Students may only depend on what they see and hear during class. When they forget a movement step, they may not have a reliable learning source to review it independently. This condition can affect learning motivation, movement understanding, and students' confidence in practicing physical skills (Telaumbanua et al., 2025; Duapadang et al., 2026; Trisnawati et al., 2024; Wang, 2024).

Instructional videos have strong potential to support PJOK learning because they can present movement techniques in a clear, repeated, and structured manner. Through video, students can observe body position, movement sequence, rhythm, direction, and common errors in performing skills. Videos can also help students learn at their own pace. They can pause, replay, and compare their practice with the examples provided. When instructional videos are integrated into an LMS, the learning process becomes more organized. Teachers can arrange materials, upload videos, provide assignments, manage discussions, monitor participation, and support students' independent practice through one digital platform (Mahzum et al., 2023; Depari et al., 2025; Syafruddin & Hamzah, 2025; Haikal et al., 2025).

An interactive video-based LMS is especially relevant for PJOK because it can connect classroom practice with independent learning. Students can use the LMS before class to learn basic concepts, during learning to access movement references, and after class to review practice guides. Teachers can also use the platform to provide learning instructions, feedback,

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and additional materials. This model supports flexible learning without removing the practical nature of PJOK. Instead, it strengthens practice-based learning by giving students clearer guidance and wider access to learning resources. Learning becomes more adaptive because students can use digital materials according to their needs, time, and learning speed (Wenzel & Moreno, 2022; Mansyur & Aminah, 2024; Karimovna, 2025).

Although digital learning has strong potential, the development of an LMS for PJOK should not be based only on technological trends. It needs to respond to real learning needs and school conditions. A digital platform will be useful only when it matches students' learning problems, students' access to devices, teachers' readiness, and available infrastructure. Schools may already have computer laboratories, internet access, LCD projectors, and digital communication tools. However, the availability of facilities does not always mean that technology has been used effectively in PJOK learning. Some schools still use technology mainly for general communication or online learning, while instructional videos, movement analysis applications, interactive features, and digital feedback remain limited (Saryono et al., 2024; Sodiq & Iwandana, 2023; Wasana et al., 2023; Koesrini et al., 2025).

This gap between infrastructure availability and actual technology use needs serious attention. If schools already have adequate devices but use them minimally in PJOK learning, then the main issue is not only access. It also involves learning design, teacher competence, institutional support, and the suitability of digital tools with PJOK characteristics. Teacher readiness is an important factor because teachers need the ability to select videos, organize LMS content, guide students, and manage digital interaction. Without clear design and support, technology may become an additional burden rather than a learning solution (Romero-Argueta et al., 2025; Suryadhianto & Mujianto, 2025; Delgado et al., 2025).

Therefore, the development of an interactive video-based LMS in PJOK learning should begin with a careful needs analysis. This analysis is needed to identify students' demand for learning videos, mobile access, independent practice, attractive media, feedback, and interactive learning support. It is also needed to understand whether the school environment is ready to support digital learning implementation. Such analysis can help ensure that the proposed LMS is practical, relevant, and suitable for PJOK learning. The focus should not only be on creating a digital product, but also on designing a learning innovation that strengthens movement understanding, supports independent practice, and improves the quality of PJOK learning in the digital era (Millah et al., 2024; Gunardi & Ariestika, 2022; Ulfah & Putranto, 2025; Hidayat et al., 2025).

Based on these considerations, this study focuses on the need for developing an interactive video-based Learning Management System for PJOK learning. The topic is important because it connects student needs, digital learning access, instructional video use, and school technology readiness in one integrated discussion. The findings are expected to provide a strong basis for developing PJOK learning media that is flexible, engaging, and aligned with students' learning characteristics. This study also offers practical value for schools and teachers who seek to improve PJOK learning through digital technology without reducing the essential role of physical activity and direct practice.

Method

Research Design

This study employed a quantitative descriptive research design using survey and observation methods. This design was considered appropriate because the study aimed to describe the

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actual needs for developing an interactive video-based Learning Management System (LMS) in Physical Education, Sports, and Health (PJOK) learning. The quantitative descriptive approach allowed the researchers to present measurable data related to students' learning needs, students' expectations toward digital learning, the availability of school technology infrastructure, and the current use of digital media in PJOK learning. The survey method was used to collect student response data through a structured questionnaire, while the observation method was used to identify the readiness of school facilities, digital platforms, and technology-based learning support. Through this design, the study did not test the effectiveness of an LMS product, but focused on identifying the level of need and readiness before the development stage.

Research Setting

The research was conducted in a school that had basic technological facilities to support digital learning activities. The school environment was selected because it provided relevant conditions for analyzing the need for an interactive video-based LMS in PJOK learning. The availability of computer laboratories, internet access, LCD projectors, digital devices, and communication platforms made the school suitable for examining the gap between existing technological infrastructure and its actual use in PJOK instruction. The research setting also allowed the researchers to observe how technology was currently used by teachers and students in the learning process.

Participants

The participants in this study consisted of 201 Grade VIII students and one PJOK teacher who was actively involved in the learning process. The student participants included 98 male students and 103 female students aged between 13 and 15 years. The students were selected because they had direct experience with PJOK learning and were considered able to provide relevant responses regarding their needs for digital learning media, instructional videos, mobile access, and independent practice support. The PJOK teacher was involved to provide contextual information related to the implementation of technology in PJOK learning and the readiness of teachers to support LMS-based learning.

Sampling Technique

This study used purposive sampling because the participants were selected based on specific criteria that matched the objectives of the study. The student inclusion criteria were active participation in PJOK learning, access to smartphones or other digital devices, and prior experience using digital learning media. These criteria were used to ensure that the respondents had sufficient experience to assess the need for digital learning support in PJOK. The PJOK teacher was selected based on direct involvement in teaching PJOK and experience in using or managing learning technology. This sampling technique helped the researchers obtain data from participants who were closely related to the research focus.

Research Focus

The focus of this study was to analyze the need for developing an interactive video-based LMS for PJOK learning. The needs analysis covered student learning problems, learning needs, feedback needs, expectations toward digital media, and school readiness to support LMS implementation. Student learning problems included difficulties in understanding movement techniques, limited use of visual learning media, and limited interaction during learning. Student learning needs included the need for instructional videos, independent practice

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guidance, and teacher feedback. Expectations toward digital media included the need for interactive features, mobile access, and attractive learning design. School readiness included the availability of technological devices, internet networks, digital platforms, learning applications, and teacher competence in using technology for PJOK learning.

Research Instruments

The instruments used in this study consisted of a student needs questionnaire and an observation sheet. The questionnaire was used to collect data on students' perceptions and needs regarding the use of digital media, instructional videos, LMS, learning flexibility, learning interaction, mobile access, independent practice, and feedback in PJOK learning. The questionnaire consisted of 18 items arranged into four main dimensions, namely learning problems, learning needs, feedback needs, and expectations toward digital learning. The questionnaire used a four-point Likert scale consisting of strongly disagree, disagree, agree, and strongly agree. The four-point scale was used to encourage respondents to give clear responses without choosing a neutral option.

The observation sheet was used to obtain data on the readiness of technology facilities and infrastructure in the school. The observed indicators included the availability of computers or laptops, LCD projectors, speakers, cameras, smart TVs, internet networks, electricity access, learning platforms, video platforms, movement analysis applications, interactive applications, and digital communication media. The observation sheet also examined the use of technology in PJOK learning, such as the use of videos for technique demonstrations, applications for learning evaluation, technology for movement analysis, LMS integration, and digital media for feedback. In addition, teacher competence in utilizing technology was observed to understand the school's readiness to implement LMS-based learning.

Instrument Development

The questionnaire was developed based on indicators related to digital learning needs, LMS utilization, instructional video use, and technology integration in PJOK learning. Each item was designed to measure students' perceptions of current learning conditions and their expectations for future digital learning support. The questionnaire items covered aspects such as difficulty understanding movements without visual examples, limited learning media, limited interaction, the need for movement learning videos, the need for independent practice outside class hours, the need for teacher feedback, the need for interactive features, mobile access, and attractive learning design. The observation sheet was developed to complement the questionnaire by providing factual data about school infrastructure and the current use of technology in PJOK learning.

Validity and Reliability

Before the main survey was conducted, the questionnaire was tested on 35 students to determine its validity and reliability. The validity of the questionnaire items was assessed using Pearson Product Moment correlation. The calculated correlation value for each item was compared with the r-table value of 0.334 at a significance level of 0.05. The validity test showed that all 18 questionnaire items had corrected item-total correlation values ranging from 0.781 to 0.930. Since all item values exceeded the minimum criterion, all questionnaire items were declared valid and suitable for data collection.

The reliability of the questionnaire was examined using Cronbach's Alpha coefficient. The reliability test produced a Cronbach's Alpha value of 0.980 for the 18 items. This value

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indicates excellent internal consistency because it is higher than the commonly accepted minimum reliability criterion of 0.70. Based on this result, the questionnaire was considered highly reliable and appropriate for measuring student needs in relation to the development of an interactive video-based LMS for PJOK learning. The observation sheet was also reviewed by experts to ensure that its indicators were relevant to the research objectives and suitable for assessing school technology readiness.

Data Collection Procedure

The data collection process was conducted in several stages. First, the researchers obtained permission from the school to conduct the study. Second, the researchers explained the purpose of the study, the type of data collected, and the confidentiality of participant responses. Third, the questionnaire was distributed to Grade VIII students to collect data about their learning problems, learning needs, feedback needs, and expectations toward an interactive video-based LMS. Fourth, direct observation was conducted to identify the availability and use of technological facilities in the school environment. The observation focused on hardware, internet access, digital platforms, learning applications, technology use in PJOK learning, and teacher competence in managing technology-based learning. After the data were collected, the questionnaire responses and observation results were organized for descriptive analysis.

Data Analysis

The questionnaire data were analyzed using descriptive percentage analysis. This analysis was used to determine the distribution of student responses for each questionnaire item and to identify the level of need for each indicator. The percentage score was calculated using the formula $P = f/N \times 100\%$, where P refers to the percentage score, f refers to the frequency of responses, and N refers to the total number of respondents. The results were then interpreted using four categories. A percentage score of 0 to 25 percent was categorized as very low need, 26 to 50 percent as low need, 51 to 75 percent as moderate need, and 76 to 100 percent as high need. Observation data were analyzed descriptively by summarizing the availability, condition, and use of school technology infrastructure. The observation findings were used to support the interpretation of the questionnaire data. This analysis helped the researchers identify whether students' needs for an interactive video-based LMS were supported by adequate infrastructure and whether the school had sufficient readiness to implement digital learning in PJOK. The combination of questionnaire and observation data provided a more complete understanding of student needs, learning conditions, and school readiness.

Result and Discussion

The results of this study present the findings obtained from the student needs questionnaire and direct observation of school technology infrastructure. The questionnaire results describe students' learning conditions, learning needs, feedback needs, and expectations toward the development of an interactive video-based Learning Management System (LMS) for Physical Education, Sports, and Health (PJOK) learning. Meanwhile, the observation results describe the availability of technological devices, learning platforms, internet access, digital media utilization, and teacher competence in using technology for PJOK learning.

Students' Learning Problems in PJOK Learning

The findings show that students did not indicate severe difficulty in understanding PJOK learning materials.

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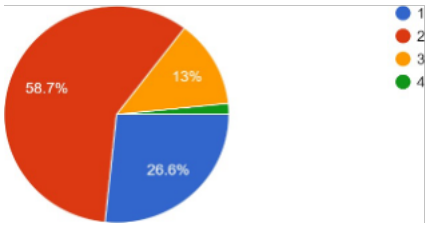

Figure 1. Students' Responses to the Need for Detailed Movement Examples in PJOK Learning

Figure 1 shows that most students disagreed with the statement related to difficulty in understanding movement examples. A total of 58.7% of students selected Disagree, while 26.6% selected Strongly Disagree. Only 13.0% selected Agree. This result indicates that most students were still able to understand movement learning, although some students still required clearer movement examples.

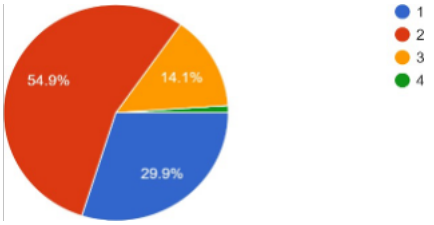

Figure 2. Students' Responses to Teacher Verbal Explanations in PJOK Learning

Figure 2 also shows a similar pattern. Most students did not report serious difficulty in following teachers' verbal explanations. A total of 55.0% of students selected Disagree, 29.9% selected Strongly Disagree, and 14.1% selected Agree. This finding indicates that teacher explanation still functions as an important part of PJOK learning. However, verbal explanation alone may not fully support repeated learning and independent practice outside classroom hours.

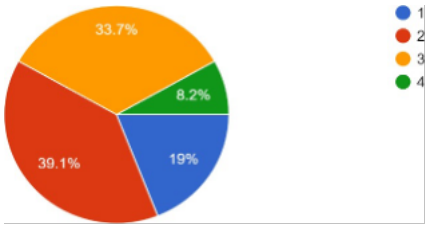

Figure 3. Students' Responses to the Use of Learning Media in PJOK Learning

Figure 3 shows that 39.1% of students selected Disagree, 33.7% selected Agree, 19.0% selected Strongly Disagree, and 8.2% selected Strongly Agree.

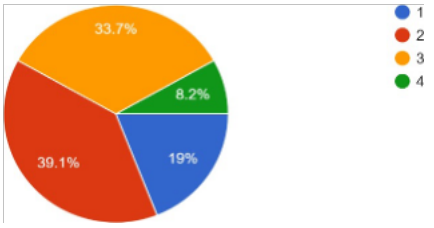

Figure 4. Students' Responses to the Use of Video Media in PJOK Learning

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Figure 4 shows the same pattern regarding the use of video media. These results indicate that students had different experiences in using learning media and video media in PJOK learning. Some students perceived that media had been used, while others still felt that its use remained limited.

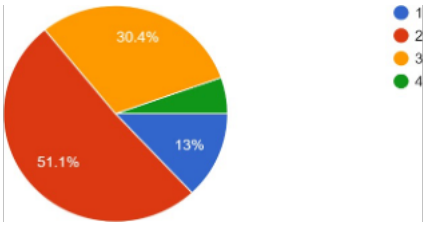

Figure 5. Students' Responses to Teacher and Student Interaction in PJOK Learning

Figure 5 shows that 51.1% of students selected Disagree regarding limited interaction with teachers, while 30.4% selected Agree and 5.5% selected Strongly Agree. This means that most students did not perceive teacher interaction as highly limited. However, more than one-third of students still felt the need for better interaction.

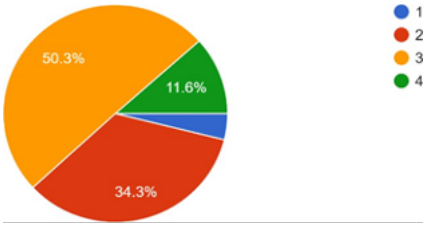

Figure 6. Students' Responses to Discussion Opportunities in PJOK Learning

Figure 6 shows that 50.3% of students selected Agree and 11.6% selected Strongly Agree regarding the availability of discussion opportunities. This result indicates that discussion opportunities were already present, but they could still be strengthened through digital learning support.

Students' Needs for Video, Practice Guidance, and Feedback

The strongest finding in the learning needs dimension was related to the need for video as a supporting medium for LMS-based PJOK learning.

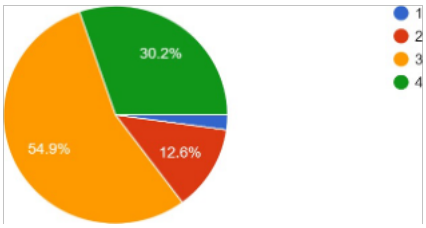

Figure 7. Students' Responses to the Need for Video Support in LMS-Based PJOK Learning

Figure 7 shows that 54.9% of students selected Agree and 30.2% selected Strongly Agree regarding the need for video support. Only 12.6% selected Disagree, and no students selected Strongly Disagree. This result indicates that most students considered learning videos important for supporting PJOK learning. Video can help students observe movement techniques, review materials, and practice more independently.

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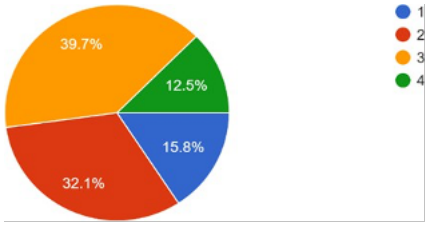

Figure 8. Students' Responses to the Contribution of Learning Videos in PJOK Learning

Figure 8 shows that students' perceptions of the contribution of learning videos were moderate. A total of 39.7% of students selected Agree and 12.5% selected Strongly Agree. Meanwhile, 32.1% selected Disagree and 15.8% selected Strongly Disagree. This result indicates that although many students recognized the usefulness of video-based learning, not all students had experienced its benefits consistently. This condition may relate to the limited use of instructional videos in PJOK learning.

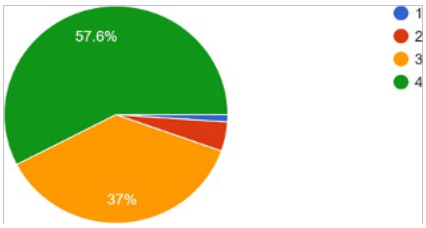

Figure 9. Students' Responses to Independent PJOK Practice Outside School

Figure 9 shows that 57.6% of students selected Strongly Agree and 37.0% selected Agree regarding independent PJOK practice outside school. Only 5.4% selected Disagree, and no students selected Strongly Disagree. This finding indicates that students strongly need learning support that allows them to practice beyond classroom sessions.

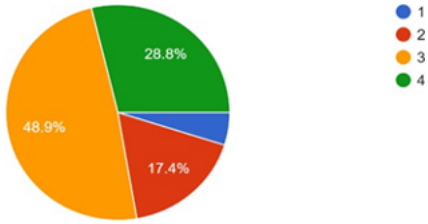

Figure 10. Students' Responses to Access to Practice Guides Outside School Hours

Figure 10 also supports this finding. A total of 48.9% of students selected Agree and 28.8% selected Strongly Agree regarding access to practice guides outside school hours. This means that 77.7% of students showed positive responses toward the need for practice guidance beyond regular learning time. Therefore, an LMS that provides structured practice guides and instructional videos is relevant to students' learning needs.

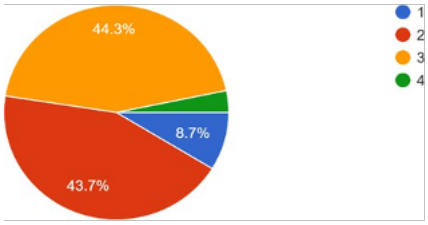

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Figure 11. Students' Responses to the Importance of Feedback After Practice

Figure 11 shows that 44.3% of students selected Agree regarding the importance of feedback after practice, while 43.7% selected Disagree and 8.7% selected Strongly Disagree. This indicates that students had different perceptions of feedback. Some students needed feedback to improve their movement practice, while others did not consider feedback as an urgent need.

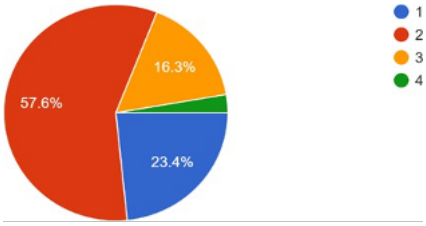

Figure 12. Students' Responses to the Need for Information on Movement Errors During Practice

Figure 12 shows that 57.6% of students selected Disagree and 23.4% selected Strongly Disagree regarding the need for detailed information about movement errors. Only 16.3% selected Agree and 2.7% selected Strongly Agree. This result indicates that detailed movement error identification was not perceived as a priority by most students.

Students' Expectations Toward Digital Learning Media

The findings show that students had different expectations toward interactive features.

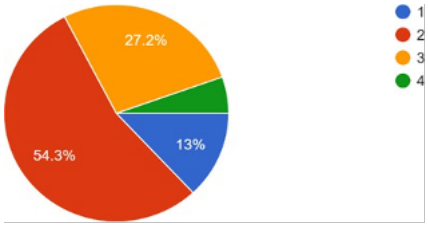

Figure 13. Students' Responses to the Need for Interactive Features in PJOK Learning

Figure 13 shows that 54.3% of students selected Disagree and 13.0% selected Strongly Disagree regarding the need for interactive features. Meanwhile, 27.2% selected Agree and 5.5% selected Strongly Agree. This result indicates that interactive features were not the main priority for most students. Students appeared to prioritize basic access to materials, videos, and practice guidance before advanced interactive features.

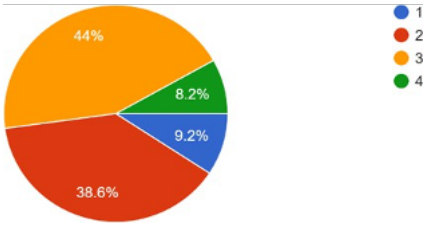

Figure 14. Students' Responses to the Use of Interactive Media in PJOK Learning

Figure 14 presents a more balanced response regarding the use of interactive media in learning. A total of 44.0% of students selected Agree and 8.2% selected Strongly Agree, while 38.6% selected Disagree and 9.2% selected Strongly Disagree. This finding suggests that interactive media still has potential to be developed, although it should not become the first focus of LMS

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development. Interactive features need to be introduced gradually and adjusted to students' readiness.

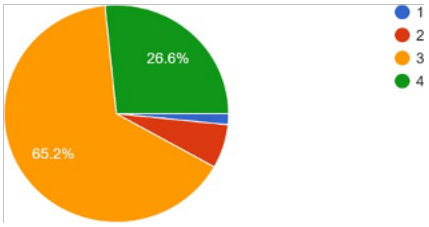


Figure 15. Students' Responses to Mobile Accessibility of PJOK Learning Materials

Figure 15 shows that 65.2% of students selected Agree and 26.6% selected Strongly Agree regarding access to learning materials through mobile devices. Only 8.2% selected Disagree, and no students selected Strongly Disagree. This means that 91.8% of students responded positively to mobile-based access.

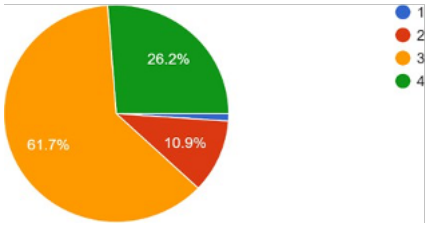


Figure 16. Students' Responses to Flexible Learning Access Through Mobile Devices

Figure 16 also shows strong support for flexible learning through mobile devices. A total of 61.7% of students selected Agree and 26.2% selected Strongly Agree. Only 10.9% selected Disagree and 1.2% selected Strongly Disagree. This finding confirms that students need learning resources that can be accessed anytime and anywhere through smartphones or other mobile devices.

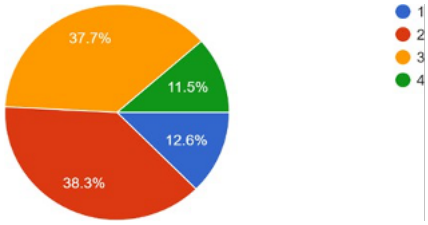
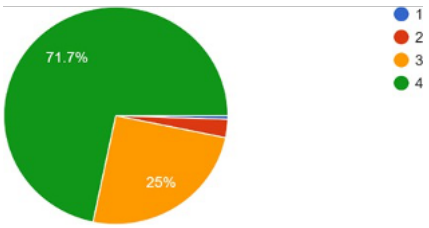


Figure 17. Students' Responses to the Influence of Learning Material Presentation on Learning Enthusiasm

Figure 17 shows a balanced response regarding the influence of material presentation on learning enthusiasm. A total of 37.7% of students selected Agree and 11.5% selected Strongly Agree, while 38.3% selected Disagree and 12.6% selected Strongly Disagree. This result indicates that the presentation of learning materials may influence student enthusiasm, but it is not the only determining factor.



DOI: https://doi.org/10.71435/738193

Figure 18. Students' Responses to Preferences for Engaging PJOK Learning Experiences

Figure 18 shows the strongest positive response regarding students' preference for learning experiences. A total of 71.7% of students selected Strongly Agree and 25.0% selected Agree. Only 3.3% selected Disagree, and no students selected Strongly Disagree. This finding indicates that students strongly expect learning experiences that are more engaging and suitable for their learning habits.

Table 1 summarizes the main questionnaire findings based on students' response patterns

Aspect	Main Indicator	Dominant Result	Interpretation
Learning problems	Difficulty understanding movement examples	85.3% selected Disagree or Strongly Disagree	Students did not report severe movement comprehension problems
Learning problems	Difficulty following verbal explanation	84.9% selected Disagree or Strongly Disagree	Teacher explanation was generally understood
Learning media	Use of media and video	Responses were mixed	Media use was not experienced equally by all students
Interaction	Teacher interaction	51.1% selected Disagree	Interaction was not highly limited, but still needs improvement
Learning needs	Video support for LMS	85.1% selected Agree or Strongly Agree	Video is a high-priority need
Learning needs	Independent practice	94.6% selected Agree or Strongly Agree	Independent practice support is a very high need
Learning needs	Practice guide access	77.7% selected Agree or Strongly Agree	Practice guidance outside school is highly needed
Feedback needs	Feedback after practice	Responses were balanced	Feedback is needed by some students but not all
Feedback needs	Movement error information	81.0% selected Disagree or Strongly Disagree	Detailed error analysis is not a priority
Digital expectations	Interactive features	67.3% selected Disagree or Strongly Disagree	Advanced interactivity is not the main priority
Digital expectations	Interactive media	52.2% selected Agree or Strongly Agree	Interactive media has moderate potential
Digital expectations	Mobile access	91.8% selected Agree or Strongly Agree	Mobile accessibility is a very high need
Digital expectations	Flexible mobile learning	87.9% selected Agree or Strongly Agree	Flexible access is a high-priority need

DOI: https://doi.org/10.71435/738193

Digital expectations	Learning experience preference	96.7% selected Agree or Strongly Agree	Students strongly expect more engaging learning experiences

Observation Results on Technology Infrastructure and Readiness

The observation results show that the school already has adequate technological devices to support digital learning. The school has 90 computers distributed across three ICT rooms, with 30 computers in each room. All computers were reported to be usable. The school also has LCD projectors in 24 classrooms, two LCDs in the hall room, one LCD in the teachers' room, one LCD in the library, and one LCD in the mosque. In addition, the school has 17 speaker or audio system units, 15 DSLR cameras, and one Smart TV or digital screen in ICT Room 1. These findings indicate that the school has sufficient hardware to support the development and implementation of digital learning.

The availability of learning applications and platforms showed a different condition. The school already had LMS access because every teacher had a Google Classroom account. Digital communication media were also available because every teacher had a WhatsApp group with students and used Google Classroom. However, the school did not yet have a specific learning video platform, movement analysis application, or interactive learning application. This result indicates that basic digital platforms were available, but more specific applications for interactive video-based PJOK learning had not been developed.

The access and technology infrastructure were generally adequate. The school had 23 Wi-Fi access points distributed throughout the school environment. The internet connection was supported by a 4G network. Each classroom had three power outlets to support electricity access. Device access for teachers and students was also categorized as good because electricity, internet, and hardware were evenly distributed and adequate for learning activities. These findings show that the school has basic infrastructure readiness to support LMS-based PJOK learning.

However, the use of technology in PJOK learning remained limited. Videos for technique demonstrations were only used one to two times per semester. Learning evaluation applications were not available. Technology for students' movement analysis was also not available. LMS integration in PJOK learning had been implemented only during online learning or home-based learning. Digital media for feedback had not yet been used. This finding shows a clear gap between the availability of technological facilities and their actual use in PJOK instruction.

Teacher competence in utilizing technology also showed partial readiness. Teachers had used technological devices during online learning and had used technology in PJOK materials during online learning. However, learning applications and digital media were not yet fully used in PJOK learning. Teachers also still had limited understanding in managing technology-based learning comprehensively. This condition indicates that LMS development should be supported by teacher training, clear technical guidance, and institutional support.

DOI: https://doi.org/10.71435/738193

Table 2. Summary of Observation Results on School Readiness

Aspect	Main Finding	Interpretation
Technology devices	Computers, LCD projectors, speakers, cameras, and Smart TV were available	Hardware readiness was adequate
LMS and communication media	Google Classroom and WhatsApp groups were available	Basic digital platforms were available
Specialized applications	Video platform, movement analysis application, and interactive application were not available	Specific PJOK digital tools were still limited
Internet and electricity	Wi-Fi access points, 4G connection, and classroom power outlets were available	Infrastructure access was adequate
Use of technology in PJOK	Videos were used only 1 to 2 times per semester	Technology use in PJOK was still low
Digital feedback	Digital media for feedback was not used	Feedback system needed development
Teacher competence	Teachers used technology during online learning but had limited comprehensive management skills	Teacher training was needed

The findings indicate that the main need for developing an interactive video-based LMS in PJOK learning is not caused by severe student difficulty in understanding teacher explanations. Figures 1 and 2 show that most students did not report serious problems in understanding movement examples or following verbal explanations. This means that the existing PJOK learning process still works at a basic level. However, the findings also show that students need learning support that extends beyond regular classroom activities. The strongest needs were related to instructional videos, independent practice, mobile accessibility, flexible learning, and more engaging learning experiences.

This result is important because it clarifies the position of the proposed LMS. The LMS should not be viewed as a replacement for direct teacher instruction or field practice. It should be positioned as a complementary learning system that strengthens PJOK learning before, during, and after class. Students still need teacher demonstration and direct practice, but they also need digital resources that allow them to review movements, access practice guides, and continue learning outside school hours. This finding is consistent with the view that LMS platforms can support accessibility, flexibility, personalization, and independent learning when they are designed according to students' needs (Wenzel & Moreno, 2022; Karimovna, 2025).

The high level of student agreement on independent practice and mobile access shows that PJOK learning needs to expand beyond the limited time available in face-to-face classes. In PJOK, students often need repeated practice to master movement techniques. However, classroom time is limited, and not all students can absorb movement instructions at the same speed. Through an interactive video-based LMS, students can access videos and practice guides repeatedly. They can learn movement sequences step by step, review difficult techniques, and practice at their own pace. This finding supports previous studies that explain the role of digital media and LMS platforms in increasing learning flexibility, student autonomy, and access to learning materials (Mahzum et al., 2023; Depari et al., 2025; Syafruddin & Hamzah, 2025;

DOI: https://doi.org/10.71435/738193

Hidayat et al., 2025). The strong need for video support also confirms that visual media is highly relevant in PJOK learning. Movement skills require clear examples, repeated observation, and practical demonstration. Instructional videos can help students see movement details that may be missed during live demonstrations. Videos also allow students to pause, replay, and compare their own practice with the movement model. Therefore, video-based LMS content can support movement understanding and independent practice. This result is in line with studies showing that digital media and video-based learning can improve student understanding, learning motivation, and participation in physical education learning (Trisnawati et al., 2024; Wang, 2024; Mansyur & Aminah, 2024).

However, the findings also show that not all digital features are equally needed by students. Detailed movement error identification and advanced interactive features received lower levels of agreement. This means that the first stage of LMS development should not focus too heavily on complex features such as advanced motion analysis, automatic correction, or highly technical interactivity. Students appear to prioritize simple, accessible, and practical learning support. Therefore, the initial LMS design should focus on a video library, structured practice guides, mobile access, simple assignments, teacher feedback, and discussion features. More advanced features can be developed gradually after students and teachers become familiar with the system.

The observation results strengthen the questionnaire findings. The school already has adequate technological infrastructure, including computers, LCD projectors, speakers, cameras, Smart TV, Wi-Fi access points, and electricity access. This indicates that the school has basic readiness to support digital learning. However, the availability of infrastructure has not been followed by optimal use in PJOK learning. Videos are used only one to two times per semester, and there are no movement analysis applications, learning evaluation applications, interactive applications, or digital feedback systems. This condition shows a gap between technological availability and instructional use.

This gap suggests that the main challenge is not only infrastructure. The challenge also relates to learning design, teacher digital competence, institutional support, and the integration of technology into PJOK pedagogy. Teachers may have access to devices and platforms, but they still need clear models for how to use them effectively in movement-based learning. Teacher competence is important because technology integration requires the ability to select relevant media, organize LMS content, design practice tasks, manage student interaction, and provide feedback. This finding is consistent with studies that emphasize the importance of teacher readiness, digital competence, and institutional support in implementing technology-based learning (Saryono et al., 2024; Suryadhianto & Mujianto, 2025; Koesrini et al., 2025).

The findings also show that Google Classroom and WhatsApp groups were already used as basic digital platforms. This provides a practical foundation for developing an LMS-based learning model. However, the current use of these platforms remains limited to communication and online learning support. They have not yet been optimized for interactive video-based PJOK learning. Therefore, the proposed LMS should not only function as a place to upload materials. It should be designed as a structured learning environment that contains video demonstrations, practice instructions, learning objectives, student assignments, feedback mechanisms, and discussion spaces.

From a learning innovation perspective, the development of an interactive video-based LMS is relevant because it responds to actual student needs and school readiness. The findings show that students strongly need mobile access, flexible learning, independent practice support, and

DOI: https://doi.org/10.71435/738193

engaging learning experiences. The school also has adequate basic infrastructure to support implementation. However, the LMS should be developed in stages. The first stage should prioritize essential features that directly match student needs. These include instructional videos, practice guides, mobile access, class discussion, and simple feedback. The second stage may include interactive quizzes, peer discussion, reflective journals, and student practice documentation. The third stage may include movement analysis features if teacher competence and technical support are ready.

This study contributes empirical evidence to the pre-development stage of digital learning innovation in PJOK. Many previous studies have examined the effectiveness of LMS or digital media after implementation. This study provides a different contribution by identifying student needs and school readiness before the LMS is developed. This is important because digital learning products should be based on real needs, not only on assumptions about technology use. The findings show that the development of an interactive video-based LMS in PJOK should focus on practical benefits for students, especially learning flexibility, mobile accessibility, and independent practice. Therefore, the proposed LMS is relevant as a learning innovation that supports the characteristics of PJOK and the needs of students in the digital era.

Conclusion

This study concludes that the development of an interactive video-based Learning Management System (LMS) is highly relevant for Physical Education, Sports, and Health (PJOK) learning because students show strong needs for flexible access, mobile-based learning materials, instructional videos, independent practice guidance, and more engaging learning experiences. The findings indicate that students do not experience severe difficulty in understanding teacher explanations or movement examples, yet they still need digital learning support that can extend learning beyond classroom hours. Observation results also show that the school has adequate technological infrastructure, including computers, LCD projectors, internet access, digital communication platforms, and other supporting devices. However, the use of technology in PJOK learning remains limited, especially in the use of instructional videos, interactive applications, motion analysis tools, LMS integration, and digital feedback. Therefore, the proposed LMS should be developed as a complementary learning system that supports teacher instruction, strengthens students' independent practice, and improves learning flexibility. The initial development should prioritize video-based materials, mobile accessibility, structured practice guides, simple feedback mechanisms, and discussion features before adding more advanced interactive functions. Since this study was conducted in one school using a descriptive needs analysis design, further research should involve broader samples and implementation trials to examine the effectiveness of the interactive video-based LMS in improving PJOK learning outcomes.

References

Bradley, V. M. (2021). Learning Management System (LMS) use with online instruction. *International Journal of Technology in Education*, *4*(1), 68-92.

Budiarsa, I. W., Utamia, D. G. S. A. M., & Sari, N. W. A. Y. (2024, December). Optimization of Dance Education Through Creative Media: Integration of Text, Video, and Audiovisuals in the Educational Process. In *Proceeding Bali-Bhuwana Waskita: Global Art Creativity Conference* (Vol. 4, pp. 214-223). https://doi.org/10.31091/bbwp.v4i1.482

DOI: https://doi.org/10.71435/738193

Cabellos, B., Pérez Echeverría, M. P., & Pozo, J. I. (2023). The use of digital resources in teaching during the pandemic: What type of learning have they promoted?. *Education Sciences*, *13*(1), 58. https://doi.org/10.3390/educsci13010058

Červenková, I., Václavík, M., & Sikorová, Z. (2023). Ways of using textbooks and digital resources by teachers and students in the lower secondary schools. *The new educational review*, *71*, 24-34. http://dx.doi.org/10.15804/tner.23.71.1.02

Delgado, A. A. E., Pacheco, R. S. C., Ávila, C. D. J. C., Morales, P. F. V., & García, A. M. L. (2025). Brecha digital y equidad: análisis de acceso y uso de recursos tecnológicos en zonas rurales pospandemia. *ARANDU UTIC*, *12*(3), 1-22. https://doi.org/10.69639/arandu.v12i3.1209

Depari, O. A., Sinambela, J. G. A., Simangunsong, R., & Sitompul, P. (2025). Peran LMS dalam Mendorong Kemandirian Belajar Mahasiswa Pascapandemi Digital. *RIGGS: Journal of Artificial Intelligence and Digital Business*, *4*(2), 2012–2016. https://doi.org/10.31004/riggs.v4i2.790

Duapadang, D. H., Amsad, L. N., Wabiser, Y. D., & Tumeno, B. (2026). Fighting Classroom Boredom: Innovative Active Learning Models To Address Student Motivation Challenges In Elementary Schools A Literature Study With Case Simulations At A Primary School In Nabire. *Multidisciplinary Indonesian Center Journal (MICJO)*, *3*(1), 678-688. https://doi.org/10.62567/micjo.v3i1.1842

Febriyanto, A. (2024). Penerapan Media Pembelajaran Berbentuk Video pada Pembelajaran PJOK materi Bolabasket SMP Islam Tirtayasa Kota Serang. *Jendela Olahraga*, *9*(1), 81-88. https://doi.org/10.26877/jo.v9i1.17083

Furqon, M., Sinaga, P., Liliasari, L., & Riza, L. S. (2023). The Impact of Learning Management System (LMS) Usage on Students. *Tem Journal*, *12*(2).

Giguruwa, N., Anh, D. H., & Pishva, D. (2012). A multimedia integrated framework for learning management systems. *eLearning-Theories, Design, Software and Applications, INTECH, Japan*, 153-172.

Gunardi, A., & Ariestika, E. (2022). PJOK Learning: How to Apply Animation Media Based on Contextual Approach? *JUARA : Jurnal Olahraga*, *7*(3), 632–640. https://doi.org/10.33222/juara.v7i3.2205

Ha, T., Moon, J., Yu, H., Fan, X., & Paulson, L. (2025). A systematic review of technology-infused physical activity interventions in K-12 school settings: effectiveness, roles, and implementation strategies. *International Journal of Behavioral Nutrition and Physical Activity*, *22*(1), 113. https://doi.org/10.1186/s12966-025-01811-x

Haikal, A., Azahra, N., & Awalia, A. A. (2025). Kajian literatur: Efektivitas Learning Management System (LMS) dalam meningkatkan kemandirian dan hasil belajar siswa di era digital. *Paedagogie*, *20*(2), 343-352. https://doi.org/10.31603/paedagogie.v20i2.15324

Hidayat, M., Sujarwo, & Dimyati. (2025). Analysis of student needs in the use of learning management systems for physical education, health, and sports at the high school level

DOI: https://doi.org/10.71435/738193

in the implementation of the Merdeka Curriculum. *Fizjoterapia Polska*, *25*(4), 124–128. https://doi.org/10.56984/8zga43112gv

Hodges, N. J., & Franks, I. M. (2002). Modelling coaching practice: the role of instruction and demonstration. *Journal of sports sciences*, *20*(10), 793-811. https://doi.org/10.1080/026404102320675648

Ishak, M. (2025). Pengembangan Media Pembelajaran Interaktif Berbasis Teknik Dasar Bola Basket untuk Meningkatkan Partisipasi Aktif Siswa. *Jurnal Pendidikan Kepelatihan Olahraga: PEJUANG*, *1*(3), 90-104. https://doi.org/10.71234/gjet.v1i2.66

Jojo' Kholistyono Ngudinur Muhammad, Nanik Indahwati, & Demy Ilmiawan. (2024). Upaya Meningkatkan Motivasi Belajar Peserta Didik melalui Media Pembelajaran Komik dalam Pembelajaran Pjok. *Jurnal Nakula : Pusat Ilmu Pendidikan, Bahasa Dan Ilmu Sosial*, *2*(6), 104–112. https://doi.org/10.61132/nakula.v2i6.1268

Karimovna, I. M. (2025). *Developing Students' Independent Learning Skills Through Digital Educational Technologies In English Language Teaching*. https://doi.org/10.5281/zenodo.18513699

Kaur, R. (2016). Role of Teachers in 21st Century. *International Journal in Management & Social Science*, *4*(4), 432-436. https://doi.org/10.62383/sosial.v3i4.1377

Kempe, A. L., & Grönlund, Å. (2019). Collaborative digital textbooks–a comparison of five different designs shaping teaching and learning. *Education and Information Technologies*, *24*(5), 2909-2941. https://doi.org/10.1007/s10639-019-09897-0

Koesrini, J., Suhartono, R. H. S., & Arafah, M. (2025). Teachers' Perceptions of the Use of Learning Management Systems in Improving Teaching Effectiveness. *Asian Journal of Applied Education (AJAE)*, *4*(4), 621–634. https://doi.org/10.55927/ajae.v4i4.15584

Mahzum, E., Sofyan, H., Nasrudin, M. F., Mailizar, M., & Herliana, F. (2023). Analysis of the utilization of the Learning Management System (LMS) as a learning media in the Physics Education Department Universitas Syiah Kuala. *Journal of Physics: Conference Series*, *2596*(1). https://doi.org/10.1088/1742-6596/2596/1/012070

Mansyur, A., Aminah, S., & Nurcaya, N. (2024, July). Beyond Traditional Teaching: The Role of Digital Media in Modern Education. In *Proceeding of International Conference on Educational Governance, Policy, and Leadership (ICEGPL)* (Vol. 1, No. 1, pp. 92-99).

Mayer, R. E. (2003). The promise of multimedia learning: using the same instructional design methods across different media. *Learning and instruction*, *13*(2), 125-139. https://doi.org/10.1016/S0959-4752(02)00016-6

Millah, A., Kusmawati, W., Ali, M. M., & Sucpto, A. (2024). Students'learning Interest In Following The Process Pjok Learning At Mi Miftahul Ulum Plinggisan. *Jupe: Jurnal Pendidikan Mandala Учредители: Lembaga Penelitian dan Pendidikan (LPP) Mandala*, *9*(3), 719.

Pettersson, F. (2021). Understanding digitalization and educational change in school by means of activity theory and the levels of learning concept. *Education and Information Technologies*, *26*(1), 187-204. https://doi.org/10.1007/s10639-020-10239-8

DOI: https://doi.org/10.71435/738193

Pujari, V. (2024). Moving to Improve Mental Health - The Role of Exercise in Cognitive Function: A Narrative Review. In *Journal of Pharmacy and Bioallied Sciences* (Vol. 16, pp. S26–S30). Wolters Kluwer Medknow Publications. https://doi.org/10.4103/jpbs.jpbs_614_23

Purnamaningsih, K. D., Hita, I. P. A. D., & Mahotama, I. B. G. J. (2025). Efektivitas Penggunaan Video Tutorial dalam Meningkatkan Keterampilan Bermain Bola Basket pada Siswa Sekolah Dasar. *JURNAL ANGGARA: Jurnal Pendidikan Olahraga, Kesehatan, Rekreasi dan Terapannya*, *2*(2), 60-68. https://doi.org/10.63987/anggara.v2i2.196

Raffiedi, R., Derta, S., Darmawati, G., Musril, H. A., Islam, U., Sjech, N., Djamil, M., Jalan, D. B., Aua, G., Putiah, K., Banuhampu, K., Bukittinggi, K., & Barat, S. (2023). Perancangan Media Pembelajaran Pendidikan Jasmani Olahraga Dan Kesehatan (Pjok) Kelas Viii Berbasis Android Menggunakan Mit App Inventor Di Mtsn 3 Agam. In *Jurnal Mahasiswa Teknik Informatika* (Vol. 7, Number 4). https://doi.org/10.36040/jati.v7i4.7316

Romero-Argueta, J., Cortez, B. G., Carranza-Cortez, L. L., & Argueta-Amaya, L. D. L. Á. (2025). Digital Teacher Competence Levels in Elementary Schools on Learning and Knowledge Technologies (LKT). *International Journal of Education, Management, and Technology*, *3*(3), 862–878. https://doi.org/10.58578/ijemt.v3i3.7415

Saryono, S., Broto, D. P., Sridadi, S., Adriansyah, R. B., & Muszali, R. (2024). Penggunaan media pembelajaran berbasis ICT pada guru PJOK sekolah menengah pertama. *Jurnal Pendidikan Jasmani Indonesia*, *20*(1), 80-87. https://doi.org/10.21831/jpji.v20i1.76029

Shoily, R. A. (2024). Classroom Feedback In The Digital Age: A Comprehensive Analysis. *IOSR Journal of Humanities and Social Science*, *29*(10), 01–04. https://doi.org/10.9790/0837-2910060104

Sinaga, A. V. (2025). Students' Perceptions of The Development of Digital Learning Platforms In Supporting The Learning Process. *JUPEIS: Jurnal Pendidikan dan Ilmu Sosial*, *4*(3), 394-402. https://doi.org/10.57218/jupeis.Vol4.Iss3.1469

Sodiq, F., & Iwandana, D. T. (2023). Observasi Sarana Prasarana Pjok di SMP N 1 Sedayu Tahun 2023. e-SPORT: Jurnal Pendidikan Jasmani. *Kesehatan dan Rekreasi*, *3*(2), 50-53. https://doi.org/10.31539/e-sport.v3i2.6474

Suryadhianto, U., & Mujianto, H. (2025). Implementation of Technology-Based Learning in Improving the Quality of Education at SMP IT Darul Ilmi Banyuwangi. *Journal of General Education and Humanities*, *4*(2), 431–446. https://doi.org/10.58421/gehu.v4i2.406

Syafruddin, M. A., & Hamzah, A. (2025). Pemanfaatan Learning Management System (Lms) Dalam Pendidikan Jasmani Untuk Pengelolaan Materi Dan Tugas. *Jurnal Teknologi Pendidikan JTekpend*, *5*(2). ISSN: 2723. https://doi.org/10.37304/jtekpend.v2i2.4768

Telaumbanua, A. A. S., Leiwakabessy, M. A., & Tampubolon, M. (2025). The Effectiveness of Active Learning Methods in Overcoming Student Learning Boredom In PAK

DOI: https://doi.org/10.71435/738193

Subject. *International Perspectives in Christian Education and Philosophy*, *2*(3), 18–28. https://doi.org/10.61132/ipcep.v2i3.390

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., ... & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and information technologies*, *28*(6), 6695-6726. https://doi.org/10.1007/s10639-022-11431-8

Trisnawati, S. A., Ridwan, M., Setiawan, E., & Ahmedov, F. (2024). Edu Sportivo Indonesian Journal of Physical Education Integrating interactive video media in physical education: a study on critical thinking and learning motivation. *Edu Sportivo: Indonesian Journal of Physical Education*, *5*(3), 289–305. https://doi.org/10.25299/es:ijope.2024.vol5(3).19073

Uibu, M., Kalma, M., Mägi, K., & Kull, M. (2022). Physical activity in the classroom: Schoolchildren's perceptions of existing practices and new opportunities. *Scandinavian Journal of Educational Research*, *66*(7), 1109-1126. https://doi.org/10.1080/00313831.2021.1958376

Ulanday, M. L., Centeno, Z. J., Bayla, M. C., & Callanta, J. (2021). Flexible learning adaptabilities in the new normal: E-learning resources, digital meeting platforms, online learning systems and learning engagement. *Asian Journal of Distance Education*, *16*(2).

Ulfah, W. A., & Putranto, D. (2025). Model pembelajaran PJOK berbasis experiential learning untuk meningkatkan basic movement skills. *Bravo's: Journal of Physical Education and Sport Science*, *13*(4), 739–752. https://doi.org/10.32682/bravos.v13i4/216

Wang, J. (2024). The Impact of Digitalization in Dance Teaching on Students' Learning Motivation and Performance. *The Educational Review, USA*, *8*(7), 950–954. https://doi.org/10.26855/er.2024.07.009

Wasana, B. A., Rahayu, T., & Kusuma, D. W. Y. (2023). Analisis Penguasaan Teknologi Informasi dan Komunikasi Guru PJOK Pasca Pandemi Covid-19. *Sporta Saintika*, *8*(2), 188-208

Wenzel, A., & Moreno, J. (2022). Designing and Facilitating Optimal LMS Student Learning Experiences [Archived]: Considering students' needs for accessibility, navigability, personalization, and relevance in their online courses. *The Northwest eLearning Journal (Inactive, Archived)*, *2*(1). https://doi.org/10.5399/osu/nwelearn.2.1.5642

Yadav, N. (2024). The impact of digital learning on education. *International Journal of Multidisciplinary Research in Arts, Science and Technology*, *2*(1), 24-34. https://doi.org/10.61778/ijmrast.v2i1.34

Zaky, I., & Iriana, S. (2025). Al-Irsyad Journal Of Education Science The Role Of Ict In Creating Interactive Learning And Fostering Student Creativity: A Literature Review. *Journal of Education Science*, *4*(2), 156–168. https://doi.org/10.58917/aijes.v4i2.202

DOI: https://doi.org/10.71435/738193