



The Challenge of Implementing Mobile Learning in Physical Education: A Comprehensive Literature Review

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Abstract. This research aims to conduct a comprehensive literature review to analyze the key challenges of mobile learning implementation in physical education field. The research method is literature study, entails investigating and evaluating existing relevant literature. Several key challenge for implementing mobile learning in physical education field was identified, such as: 1) Readiness of facilities, technical support, and infrastructure; 2) Preparedness of the mobile learning system; 3) Monitoring and evaluation procedures; 4) Readiness of both educators and students; 5) Apprehensions regarding screen time. Hence, addressing the identified key challenges is imperative for achieving effective and efficient utilization of mobile learning implementation.

Keywords: Mobile Learning, Technology, Physical Education, Challenge.

1 Introduction

The landscape of physical education learning has undergone a profound digital transformation in recent years, marking a notable shift in various key dimensions. This transformation is characterized by the integration of cutting-edge technology, heightened accessibility to information, and a reorientation of the learning paradigm towards the fourth industrial revolution, notably through the utilization of Open Learning Platforms [1], [2]. Presently, the pervasive use of digital technology in the physical education field has been widely embraced in Indonesia. A noteworthy manifestation of this integration is observed in the implementation of mobile learning (m-learning), representing a form of remote learning where learners leverage portable devices such as smartphones, tablets, and computers to access educational content at their convenience, transcending temporal and spatial constraints [3].

The adoption of m-learning platforms stands out as a distinctive practice, offering learners guidance in exercises and facilitating progress monitoring. These platforms go beyond conventional instructional methods by providing paradigmatic demonstrations seamlessly integrated into physical activities [4]. This dynamic approach to learning not only capitalizes on the versatility of digital devices but also enhances the educational experience by making it more flexible, accessible, and interactive. The integration of m-learning represents a pivotal advancement in the domain of physical education, embodying the intersection of pedagogy and technology to cultivate a more adaptive and engaging learning environment.

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M-learning holds significant relevance in the context of physical education. Students can access learning materials and exercise guidance at their convenience as long as they have a mobile device [2]. M-learning enables learning without constraints of time or location, enhancing flexibility in training schedules and physical activities [5]–[7]. Furthermore, m-learning facilitates a more dynamic and interactive learning approach [5], [8], [9]. With the integration of such technology, physical education through m-learning can be personalized according to the needs of students.

M-learning also serves as a source for theoretical learning in physical education [10]. Various m-learning platforms can provide learning materials, assignments, and evaluations [11]. It eases the use of digital learning resources, such as videos, images, and interactive simulations, enriching the learning material [12]. Teachers can leverage multimedia services, digital presentations, and online learning tools to enhance the effectiveness of education. M-learning not only aids students but also supports teachers in utilizing these technologies.

Post the COVID-19 pandemic, the application of technology through m-learning has given rise to a new concept called hybrid learning. Hybrid learning, also known as blended learning, combines online learning materials with conventional face-to-face teaching [13]. It allows for both physical presence and virtual participation, aiming to integrate the advantages of conventional and online learning while providing flexibility and equality in the student experience [12]. In its implementation, hybrid learning may use video conferencing platforms for synchronous sessions. Additionally, there is a growing trend among education practitioners to incorporate Augmented Reality (AR) and Virtual Reality (VR) technologies in hybrid learning. The development of immersive learning experiences through AR and VR technologies is indicated to provide more realistic simulations of sports or physical activities for students. The use of such technologies transports students to virtual environments, enhancing their understanding of specific concepts without being confined to physical spaces [10].

M-learning supports collaborative learning by allowing students and teachers to easily share information, projects, and ideas through social learning network (SLN) platforms [14]. Online forums and discussion platforms serve as spaces for students to share experiences, ideas, and information [2]. Collaborative tools, such as Google Docs or e-learning platforms, facilitate cooperation and communication among students. Technology enables adaptable learning systems to meet the needs and understanding levels of individual students. Adaptive learning systems use artificial intelligence to adjust the curriculum and provide customized materials based on students' needs. The integration of technology allows for more innovative and engaging teaching methods. Thus, integrating technology into learning activities not only influences the student experience but also provides new opportunities to enhance overall education quality [15].

The integration of m-learning in the physical education field brings about numerous benefits, particularly in terms of monitoring and evaluation. M-learning facilitates efficient and effective assessment of students' understanding and application of physical education concepts [16]. The integration of online evaluation tools not only simplifies the assessment process but also enhances accuracy and avoids human error.

Based on the above overview, it can be concluded that the mobile learning environment can be designed with specific characteristics such as distance education, visualization, interactivity, and usage efficiency [17]. The use of technology in physical education learning has various benefits, from enhancing student interactions to expanding learning

spaces. The application of technology in physical education can motivate students, facilitate more interactive learning, and provide opportunities for innovation in teaching methods. However, the implementation of m-learning in the field of physical education is not without its challenges.

The challenges of implementing m-learning in physical education pose a risk of reducing the effectiveness of the learning process. Current conditions include uncoordinated m-learning technologies, difficulty in applying physical education materials in a mobile context, and issues related to the security and privacy of m-learning users [18]. Unfortunately, based on a search of databases including Google Scholar, Science Direct, Taylor & Francis, and PubMed, there is currently no empirical review study identifying the challenges faced by the field of physical education in m-learning implementation. Such studies are crucial to assist education practitioners in designing mature and relevant curricula for the future.

This research aims to conduct a comprehensive literature review on the challenges faced by the field of physical education in the process of implementing m-learning in learning activities. This study is expected to provide benefits to the government, curriculum developers, educators, and education counselors.

2 Research Approach

The research methodology employed in this study is a literature review. The literature review method involves a series of activities related to collecting bibliographic data, reading and note-taking, as well as processing research materials [19]. The research method involving a literature review, also known as a literature review study, is an investigative approach that evaluates existing relevant literature. Its aim is to construct a comprehensive understanding of the research topic and present significant findings made by previous researchers.

The methodology used in composing this article is based on a literature review. This review encompasses the author's evaluations, summaries, and reflections on various literature sources, including articles, books, slides, website information, and other relevant materials related to the key challenge of implementing mobile learning in the physical education field. To explore articles, this study utilizes databases such as Google Scholar, Science Direct, Taylor and Francis, and PubMed. The specific keywords used in this study include "((Challenge) AND ("Mobile Learning")) OR ("M-learning")) AND ("Physical Education)".

3 Result

The identification process found that there were 1353 articles in database that relevant to the topic keywords. After screening process, 992 articles were excluded as they did not align with the research topic. Meanwhile, another 361 articles considered to meet the inclusion criteria were then subjected to the feasibility test. A total of 354 articles were excluded because they did not align with the research objectives, leaving 7 articles. Out of these 7 articles, three of them were book chapters and were therefore excluded. This leaves a total of four literature pieces that entered the inclusion phase.

Based on the research procedure process above, four literature pieces were selected based on their relevance to the topics of key challenges of physical education field through mobile learning technology. The following is a summary of the research findings:

Table 1. The Key Challenge of Implementing Mobile Learning in Physical Education

Author's name, year of publi- cation	The Key Challenge Findings
Vishwakarma. (2015). [18]	The key challenges that author mention including: <ol style="list-style-type: none"> 1. Lack of access to mobile devices and reliable internet connectivity. 2. Limited technical support and infrastructure. 3. Resistance from educators and students unfamiliar or uncomfortable with mobile technology for learning. 4. Concerns about privacy and data security 5. The need for effective training and professional development for educators to seamlessly incorporate mobile learning into their teaching practices. 6. Ensuring fair access to mobile devices and internet connectivity for all students, regardless of their socioeconomic background, is a significant obstacle to implementing mobile learning.
Killian et. al. (2021). [20]	The key challenges that author mention including: <ol style="list-style-type: none"> 1. Limited access to adequate space and equipment for physical activity at home. 2. Difficulty in monitoring student engagement and participation during online classes, especially if students do not activate their cameras. 3. The need to design engaging online lessons that students want to engage with. 4. The potential for distance learning to add to students' screen time burden. 5. The need to address a wider variety of content from across the curriculum, including skill-based learning. 6. The need to help students understand the value of physical education tasks during these times to stimulate motivation and prompt meaningful engagement and reflection. 7. The need for teachers to balance learning new technology skills to translate their content online, often while trying to balance the challenges of doing so at home.
Goad et. al. (2021) [20]	The key challenges that author mention including: <ol style="list-style-type: none"> 1. Concerns about instruction, assessment, and accountability of physical activity completed by students correctly. 2. Hesitancy within the physical education profession to support online delivery 3. Concerns about promoting healthy lifestyles through physical activity and teaching fundamental motor skills and movement patterns in an online environment, which are believed to be less as reliable as conventional ways. 4. These challenges highlight the complexities of adapting physical education to a distance learning format and the need for careful consideration of instructional design, technology, and assessment methods in online physical education courses.

Goad et. al. (2019) [21]	<p>The key challenges that author mention including:</p> <ol style="list-style-type: none"> 1. Balancing Technology and Personal Attention: <ol style="list-style-type: none"> a. Need to find the right balance between instruction, training, personal attention, and modern technology. b. Excessive reliance on technology can lead to poor performance. 2. Optimal and Effective Integration Methods: <ol style="list-style-type: none"> a. Adoption of technology alone does not guarantee optimal integration methods. b. Innovative educational technologies may promise efficiency and interactivity but don't always ensure effective learning outcomes. 3. Alignment with Course Goals and Learning Outcomes <ol style="list-style-type: none"> a. Instructional design and technologies should align with course goals and learning outcomes. b. Online physical educators need to consider appropriate uses of technology to enhance student learning in virtual environments.
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4 Discussion

The rapid evolution of technology has profoundly impacted the educational system, catalyzing the emergence of more practical and engaging learning methodologies to elevate educational standards. Smartphones, which are ubiquitous among students, offer a promising prospect for the advancement of learning resources within educational institutions. The escalating information processing capabilities of mobile devices have paved the way for Mobile Learning [22].

Mobile learning in physical education offers opportunities for spontaneous, personal, informal, and location-based learning [23], Technological advancements have transformed the learning process, not only in formal education environments but also in continuous education. Mobile learning is part of the new learning landscape, providing opportunities for spontaneous, personal, informal, and situated learning. By incorporating mobile technology into education, online learning communities can bring together students from diverse backgrounds and learning styles in an educational environment. This facilitates the integration of students with diverse learning styles into educational settings [18].

Mobile learning comes with advantages, such as facilitating learning processes without constraints of time, space, and location [9]. It can be utilized as an alternative to face-to-face learning, especially during the Covid-19 pandemic [24]. Tablets, smartphones, and laptops can serve as supporting devices for mobile learning [21]. However, challenges need to be considered, such as the need for teachers to acquire skills in operating devices and designing digital teaching materials. Overall, mobile learning in physical education brings opportunities for a richer learning experience but requires addressing challenges related to implementation and teacher preparation. However, there are also obstacles and challenges to implementing mobile learning and supporting a competitive educational experience [18].

Implementing online learning, particularly in the context of mobile learning for physical education, presents a multifaceted set of challenges as we can see in Table 1. These obstacles encompass several issues, that can be broadly classified into several key categories such as 1) Readiness of facilities, technical support, and infrastructure; 2)

Preparedness of the mobile learning system; 3) Monitoring and evaluation procedures; 4) Readiness of both educators and students; 5) Apprehensions regarding screen time.

First and foremost, the readiness of facilities, technical support, and infrastructure is of utmost importance [18]. Examples related to these facilities, technical support, and infrastructure include internet connectivity, facilities and pre-facilities supporting learning activities, and even proficient mobile devices for both students and teachers [20]. Internet access and the availability of adequate devices are crucial for the smooth process of mobile learning [18]. Based on this description, the 3T regions (terdepan, terperencil, tertinggal) also known as frontier, outermost, and least developed regions are certain to face numerous challenges in transitioning from conventional face-to-face learning to mobile learning. In addition to connectivity and mobile devices, the success of mobile learning is also highly dependent on the availability of sports equipment for students [20]. Without proper sports equipment and supporting infrastructure, the potential of mobile learning remains underutilized.

Secondly, the readiness of mobile learning systems often lacks concern for user security and privacy aspects [18]. The government needs to implement preventive measures to protect users' personal data, ensuring privacy and confidentiality to build trust and maintain the integrity of the learning environment. Without data security and user privacy, the risk of personal data leakage is considerably high.

Thirdly, monitoring and evaluation in a mobile learning environment are challenging without direct face-to-face supervision from teachers [21], [25]. Students often lack motivation in mobile learning environments, leading to improper execution of movements and forms of physical education learning. Additionally, motivation also affects the consistency of student exercises, which cannot be directly monitored by teachers. Integration and strategies are needed to overcome these challenges, allowing for accurate and effective monitoring and evaluation of student learning.

Fourthly, the readiness of teachers and students to use mobile learning technology [18][20]. Teachers need to adapt learning materials, content, and physical education objectives to the capabilities and limitations of mobile platforms [25]. Similarly, students need to enhance digital literacy and adjust the physical education learning process, which involves more independent activities compared to conventional learning.

Lastly, concerns about screen time and its health impact should not be ignored [20]. Numerous studies indicate an increased prevalence of digital eye strain due to the use of mobile learning, especially during the recent pandemic[26], [27][28]. Excessive screen time not only has negative physical effects but also mental impacts, such as an increased tendency for depression and higher anxiety levels [29], [30]. Therefore, to address these concerns, teachers also need to prepare strategies to promote sufficient breaks and overall psychological well-being in the digital learning environment.

In summary, the integration of mobile learning in the field of physical education opens doors to a more enriching learning experience, characterized by spontaneity, personalization, informality, and situated learning. Nevertheless, challenges in its successful implementation persist, particularly concerning teacher preparation, technical support, and the need for robust infrastructure.

5 Conclusion

This study highlight significant challenges in introducing mobile learning to the physical education field, underscoring the need for attention in various areas, such as: 1) Readiness of facilities, technical support, and infrastructure; 2) Preparedness of the mobile learning system; 3) Monitoring and evaluation procedures; 4) Readiness of both educators and students; 5) Apprehensions regarding screen time. Despite these challenges, the incorporation of mobile learning unveils diverse opportunities and potential for the future. Hence, addressing the identified key challenges is imperative for achieving effective and efficient utilization of mobile learning implementation.

References

1. D. Lase, "Education and industrial revolution 4.0," *J. Handayani*, vol. 10, no. 1, pp. 48–62, 2019, doi: 10.24114/jh.v10i1.14138.
2. K. Label, K. Danylchuk, and P. Millar, "Social Media as a Learning Tool: Sport Management Faculty Perceptions of Digital Pedagogies," *Sport Manag. Educ. J.*, vol. 9, no. 1, pp. 39–50, 2015, doi: 10.1123/smej.2014-0013.
3. M. L. Crescente and D. Lee, "Critical issues of m-learning: Design models, adoption processes, and future trends," *J. Chinese Inst. Ind. Eng.*, vol. 28, no. 2, pp. 111–123, 2011, doi: 10.1080/10170669.2010.548856.
4. S. Tkachuk, O. Melnyk, and S. Voroshilov, "Implementation of mobile learning technologies in the system of distance education," *Collect. Sci. Work. Um. State Pedagog. Univ.*, vol. 1, pp. 72–78, doi: 10.31499/2307-4906.1.2023.276939.
5. I. V. Izhdeneva, "Characteristic of basic tools of mobile learning in informatics," *Informatics Sch.*, no. 2, pp. 9–13, 2021, doi: 10.32517/2221-1993-2021-20-2-9-13.
6. L. Liang, Z., Wang, Y., & Huang, "Overview of mobile learning," in *IEEE 3rd International Conference on Computer Science and Educational Informatization (CSEI)*, 2021, pp. 168–175. doi: 10.1109/CSEI51395.2021.9477761.
7. Y. Shang, "Functional Design and Model Development on Mobile Learning System of College English," in *2022 2nd International Conference on Social Sciences and Intelligence Management (SSIM)*, 2022, pp. 45–47. doi: 10.1109/SSIM55504.2022.10047931.
8. H. Uzunboylu and N. Azhar, "Mobile learning as a new technology in education," *Glob. J. Inf. Technol. Emerg. Technol.*, vol. 13, no. 1, pp. 07–16, 2023, doi: 10.18844/gjit.v13i1.8459.
9. M. Casmat and B. A. Pribadi, "the Use of Mobile Learning To Enhance Learning Innovation Pasca Pandemic Covid-19," *J. Learn. Technol.*, vol. 1, no. 2, pp. 86–94, 2022, doi: 10.33830/jlt.v1i2.4262.
10. B. A. Pratama, S. Sucipto, and Y. Nanda Hanief, "Improving learning in physical education: Augmented reality mobile app-based for fundamental motor skill," *J. Sport. J. Penelit. Pembelajaran*, vol. 8, no. 2, pp. 314–326, 2022, doi: 10.29407/js_unpgri.v8i2.18508.
11. A. Gumantan, R. A. Nugroho, and R. Yulindra, "Learning During the Covid-19 Pandemic: Analysis of E-Learning on Sports Education Students," *J. Sport Area*, vol. 6, no. 1, pp. 66–75, 2021, doi: 10.25299/sportarea.2021.vol6(1).5397.
12. G. F. Friskawati, "Self-confidence using technology, understanding of TPACK and teaching quality of physical education's teacher candidate while online learning," *J. Sport. J. Penelit. Pembelajaran*, vol. 7, no. 2, pp. 286–302, 2021, doi: 10.29407/js_unpgri.v7i2.15948.
13. A. Haryanti, M. Yusuf, and L. Agung, "Students' Perceptions About the Use of Android-Based Learning Media in Physical Education Learning," *AL-ISHLAH J. Pendidik.*, vol. 13, no. 2, pp. 836–842, 2021, doi: 10.35445/alishlah.v13i2.633.
14. F. Dalipi, F. Idrizi, and A. Kurti, "Exploring the impact of social learning networks in M-learning: A case study in a University environment," *Lect. Notes Comput. Sci. (including Subser. Lect. Notes Artif. Intell. Lect. Notes Bioinformatics)*, vol. 10295

- LNCS, pp. 189–198, 2017, doi: 10.1007/978-3-319-58509-3_16.
15. M. M. Grant, “Difficulties in defining mobile learning: analysis, design characteristics, and implications,” *Educ. Technol. Res. Dev.*, vol. 67, no. 2, pp. 361–388, 2019, doi: 10.1007/s11423-018-09641-4.
 16. M. F. Ayeni and P. O. Olugbuyi, “Utilization of Mobile Learning in the Teaching of Science for Sustainable Development,” *Eur. J. Educ. Stud.*, vol. 9, no. 5, pp. 347–353, 2022, doi: 10.46827/ejes.v9i5.4386.
 17. Z. Cheng-xia, W. Hong, and L. I. Cheng-zhong, “Investigation and Research on the Application of Mobile Learning Tools in Higher Vocational College Students,” *Int. J. Humanit. Soc. Sci. Educ.*, vol. 5, no. 9, pp. 37–42, 2018, doi: 10.20431/2349-0381.0509006.
 18. A. Vishwakarma, “Benefits and challenges of mobile learning in education,” in *Promoting active learning through the integration of mobile and ubiquitous technologies*, 2015, pp. 24–36. doi: 10.4018/978-1-4666-6343-5.CH002.
 19. M. Zed, *Metode Penelitian Kepustakaan*. Yogyakarta: Yayasan Pustaka Obor Indonesia.
 20. C. M. Killian, D. N. Daum, T. Goad, R. Brown, and S. Lehman, “How Do We Do This? Distance Learning in Physical Education — Part 2,” *J. Phys. Educ. Recreat. Danc.*, vol. 92, no. 4, pp. 11–17, 2021, doi: 10.1080/07303084.2021.1886838.
 21. S. Goad, T., Towner, B., Jones, E., & Bulger, “Instructional tools for online physical education: Using mobile technologies to enhance learning,” *J. Phys. Educ. Recreat. Danc.*, vol. 90, no. 6, pp. 40–47, 2019, doi: 10.1080/07303084.2019.1614118.
 22. H. Yu and P. Kulinna, “Development of a Customized Mobile Application in Sport Education,” *J. Heal. Sport. Kinesiol.*, vol. 1, no. 1, pp. 9–11, 2020, doi: 10.47544/johsk.2020.1.1.9.
 23. Q. F. Yang, G. J. Hwang, and H. Y. Sung, “Trends and research issues of mobile learning studies in physical education: a review of academic journal publications,” *Interact. Learn. Environ.*, vol. 28, no. 4, pp. 419–437, 2020, doi: 10.1080/10494820.2018.1533478.
 24. H. Yu, P. H. Kulinna, and K. A. Lorenz, “An Integration of Mobile Applications into Physical Education Programs,” *Strategies*, vol. 31, no. 3, pp. 13–19, 2018, doi: 10.1080/08924562.2018.1442275.
 25. T. Goad, E. Jones, S. Bulger, D. Daum, N. Hollett, and E. Elliott, “Predicting Student Success in Online Physical Education,” *Am. J. Distance Educ.*, vol. 35, no. 1, pp. 17–32, 2021, doi: 10.1080/08923647.2020.1829254.
 26. L. Q. Thao *et al.*, “Eye Strain Detection During Online Learning,” *Intell. Autom. Soft Comput.*, vol. 35, no. 3, pp. 3517–3530, 2023, doi: 10.32604/iasc.2023.031026.
 27. R. Gupta, L. Chauhan, and A. Varshney, “Impact of E-schooling on digital eye strain in Coronavirus Disease Era: A survey of 654 students,” *J. Curr. Ophthalmol.*, vol. 33, no. 2, pp. 158–164, 2021, doi: 10.4103/joco.joco.
 28. A. Mohan, P. Sen, C. Shah, E. Jain, and S. Jain, “Prevalence and risk factor assessment of digital eye strain among children using online e-learning during the COVID-19 pandemic: Digital eye strain among kids (DESK study-1) Amit,” *BMC Ophthalmol.*, vol. 69, no. 1, p. 140, 2021, doi: 10.4103/ijo.IJO_2535_20.
 29. W. X, L. Y, and F. H, “The associations between screen time-based sedentary behavior and depression: a systematic review and meta-analysis,” *BMC Public Health*, vol. 19, no. 1, p. 1524, 2019, [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/31727052/>
 30. D. Maras *et al.*, “Screen time is associated with depression and anxiety in Canadian youth,” *Prev. Med. (Baltim.)*, vol. 73, pp. 133–138, 2015, doi: 10.1016/j.ypmed.2015.01.029.

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