Digital Transformation of Physical Education in Higher Education (2018–2024): A Systematic Review of Virtual, Hybrid, and AI-Enabled Modalities

Dr. Rakesh Kumar Tiwari[1]

[1]Assistant Professor Physical Education, Govt. Degree college Unnao, UP

Abstract

The period between 2018 and 2024 saw a rapid digital transformation of higher education and physical education globally, significantly accelerated by technological innovations and the COVID-19 pandemic. This systematic review analyses the three key approaches driving this change: virtual methods i.e., fully online physical education; hybrid methods, which combine online and face-to-face learning; and artificial intelligence-based methods, such as adaptive learning platforms, intelligent learning systems, and wearable technology. The study analysed a comprehensive collection of peer-reviewed and open access literature published from 2018 to 2024. Key findings show that virtual physical education expanded rapidly beyond 2020, ensuring continuity of instruction but also producing challenges related to kinetic learning and student engagement. Hybrid physical education approaches have emerged as the new normal, combining the benefits of online face-to-face learning while increasing flexibility, motor skill acquisition, and student motivation, while artificial intelligence-based innovations such as adaptive learning, VR/AR simulations, computer vision-based training tools, Wearable devices have enabled personalized learning, instant feedback, and data-driven assessment Overall, the digital transformation has brought significant benefits in student engagement, personalized learning, assessment accuracy, and inclusion for diverse learners. But challenges remain such as lack of direct physical interaction in virtual environments, need for effective instructional design in blended learning, teacher training gaps, data privacy concerns, unequal access to technology This review presents an integrated analysis of current trends and technological innovations in digital physical education and highlights best practices and future directions. Ultimately, achieving a sustainable, student-cantered digital transformation in physical education will require addressing infrastructural disparities, developing teacher skills, and implementing policies that integrate technological possibilities with ethical pedagogical balance.
Keywords: physical education, digital transformation, blended learning, artificial intelligence, higher education

Introduction

Physical education in higher education is undergoing profound changes, primarily due to the widespread integration of digital technologies. Unlike purely cognitive disciplines, physical education is fundamentally a physical and functional domain, traditionally based on direct motor practice, physical participation, and immediate teacher feedback educational institutions worldwide are beginning to experiment with technological innovations aimed at improving physical education teaching and learning. For adoption of new digital tools and methods, from online platforms to artificial intelligence-based systems Several interconnected factors have appeared driving this digital transformation in 2018 and 2024. First, rapid advances in ICTs and artificial intelligence provided new technological tools for education. Motion-tracking cameras, virtual augmented reality systems and artificial intelligence-based training and applications, which opened possibilities to address long-standing challenges in physical education, such as instant performance feedback, personalization of training, extending practice beyond class time encouraged; For example, UNESCO and the European Union have identified the use of digital tools in various educational areas

including physical health education as a means of improving student engagement and learning outcomes This emergency transition prompted rapid adoption of fully online virtual physical education methods. While this process also revealed the potential of online physical education through live video exercises, instructional videos, and fitness apps, it also revealed limitations such as the lack of direct physical instruction and disparities in Enlightened in home resources.

Early indications from the literature suggest that interest in technology-assisted physical education developed before the pandemic, but accelerated at an unprecedented pace after the pandemic, with a bibliometric analysis of 597 research studies published from 2010 to 2024 showing a significant increase The field of intelligence, wearable technologies and hybrid learning models progressed from an early exploration phase (2010–2017) to a developmental phase (2018–2021), reaching a more mature stage after emerging as a key focus of digital innovation Kinesiology, teacher training, etc., have rapidly adopted digital media to improve teaching and learning outcomes Despite this increasing momentum, it is essential to understand how these digital methods are reshaping physical education as a whole. While many case studies and pilot projects focus on specific tools or interventions, comprehensive analysis of broader trends, benefits, and challenges inherent in different forms of implementation is relatively limited Fully online virtual physical education, including online forums, live exercise classes, video demos, interactive fitness apps Includes synchronous or asynchronous learning through virtual reality-based programs conducted off-campus Hybrid physical education, which systematically gamifies direct physical exercises online modules, video activities, and integrates with models such as the flipped classroom and artificial intelligence-based physical education, A comparative analysis of the benefits, challenges, and innovations enabling personalized and enhanced learning through adaptive learning platforms, intelligent tutoring systems for motor skills, AI-enabled wearable devices, computer vision-based technology feedback systems, and other smart technologies is provided to clarify which strategies Different educational goals such as improving fitness, teaching sports skills, and student engagement proved most effective in achieving them, and what barriers limited their successful implementation. Furthermore, the insights gained will help educators, administrators, and policymakers make informed decisions about the inclusion of digital media in physical education curricula and provide researchers with directions for future research.

Methodology

The literature review in this study was conducted as an academic-style systematic review, in line with PRISMA guidelines, multi-database searches in Web of Science, Scopus, PubMed/MEDLINE, ERIC, and Google Scholar databases to ensure transparency and comprehensiveness of the research process Studies that incorporated new research from leading publishers like MDPI, Sage, and IEEE Xplore, used keywords and Boolean operators related to physical education, digital media, and higher education, and also included manual searches of reference lists of relevant articles, using online, hybrid/mixed, or AI-based digital media Included those published in peer-reviewed format during 2018–2024 Non-academic non-English sources (where translations were not available) were excluded, although some policy-based documents count as references for global perspectives We imported all search results into reference management software that Removing duplicates, selecting title and abstract full-text levels, and extracting from each study the year of publication, country, study design, sample, digital media used, key findings (benefits and challenges) are categorized. A qualitative narrative synthesis was adopted, as a meta-analysis was not possible due to the heterogeneity of the data. Finally, insights from all these channels were integrated and discussed to consider the overall status of the digital transformation of physical education in higher education as well as practical possibilities for future research.

Results

Virtual Physical Education (Fully Online Methods)

Virtual physical education, i.e., conducting entirely online courses without face-to-face classes, appeared as a major educational trend globally, especially in 2020–2021 due to the COVID-19 pandemic. The closure of university campuses forced higher education institutions to rapidly implement online PE classes to set up physical education credits and physical activity programs but by 2020 virtual PE will expand to universities in many countries including China, the US and the Philippines. By 2021–2022, a systematic evaluation of its effectiveness, challenges, and learning began. Research findings show that virtual PE ensured continuity of instruction in the absence of face-to-face classes and provided opportunities for students to learn exercise, game theory, and health education from home. For example, a qualitative study at the University of the Philippines Diliman showed that the emergency online PE program maintained students' health and fitness knowledge, understanding of the importance of physical activity, and partly maintained their psycho-physical well-being To adapt activities to daily-routines, and allow engagement through videos, quizzes, fitness apps, gamification, and social media-based communities maintains or in some cases increases joint, the study showed It was also found that emotional and cognitive engagement was positively associated with students' psychological well-being in online PE. Furthermore, virtual PE has shown the potential to increase accessibility for nontraditional, off-campus, or students with certain physical conditions, provided that the content is inclusive and easily designed. However, despite these advantages, fully online PE faced several serious limitations especially in terms of motor skill development, sport-specific techniques, social interaction, and responsibility development, who found it difficult to learn effectively via screens In the Chinese context, a study identified lack of real-world experiences, peer interaction, home environment barriers, and limitations as key factors reducing online PE quality reducing online PE quality Adopted innovations such as fitness and wellness-focused courses, combining individual activity goals with theoretical knowledge, two-way communication pre-recorded video libraries, fitness trackers, self-reflection logs, and limited virtual reality, among which advanced engagement and accountability goals Shown Overall, virtual PE in higher education during the 2018–2024 period played an important role in ensuring academic continuity during the crisis, namely health education, demonstrating that components like basic fitness can be effectively taught online but limitations in terms of advanced motor skills training and social and physical experience They were the same. As a result, most organizations since the pandemic have prioritized hybrid models, where they have simultaneously received help from virtual flexibility and the potential for direct physical exercise.

Hybrid Physical Education (Blended Learning Methods)

Hybrid physical education refers to teaching models that integrate traditional face-to-face classes and online or digital components into the curriculum. These blended approaches have become increasingly important in higher education, particularly since 2018. Unlike fully virtual PE, which was adopted more systematically in courses following the pandemic experience, hybrid models, which gained traction around 2018 and accelerated in early 2020, keep essential elements for motor skill practice, social interaction, and teacher-student feedback. A systematic review by Wang and colleagues (2023) found a significant increase in published research adopting this approach during this period. In practice, several forms of hybrid PE have emerged, notably the flipped classroom model, where students first watch technical videos, read exercise theory, or complete online rules quizzes, followed by practical exercises, drills, and direct feedback from the teacher in class. Other approaches include self-directed online activities during the week, with on campus play practice sessions. Several organizations have adopted asynchronous online discussions, social media groups, and wearable technology to supplement classroom activities, providing creative examples that foster self-

reflection, goal-setting, and engagement, such as the "What Do You Know" model that combines online knowledge-based interactive content with gymnastics exercises, demonstrating that technology is intended to enhance, not replace, physical learning. In terms of impact, research generally indicates that well-designed hybrid models can yield better learning outcomes than traditional methods. In one peer-reviewed study, the hybrid "What Do You Know" model showed superior results not only in motor skill performance but also in knowledge retention and motivation levels compared to a traditional group. These dimensions can enhance the depth and impact of learning. This experience is often seen in higher education contexts.

Several studies have highlighted added benefits of hybrid physical education, the most prominent of which is improved student engagement. Interactive elements of online media, such as instructional videos, quizzes, and gamified challenges, activate student interest outside the classroom, resulting in them attending face-to-face classes with greater preparation and enthusiasm amplifies, which is especially beneficial for classes with varying abilities. Students who are lagging in a skill can get extra practice by watching repeated tutorial videos, while advanced students can explore advanced activities or challenging exercises provided by the teacher. This differentiated teaching approach gives each student the opportunity to improve according to their weaknesses and strengths, enhancing the performance of the whole class. Flexibility and continuity are also important features of hybrid PE, such that if a student is unable to meet in class due to illness or scheduling, they can compensate for learning through online modules. In addition, the hybrid model offers an opportunity to enhance theoretical and analytical skills in physical education, as topics that could not be discussed in depth due to limited time in traditional classrooms, such as kinesiology or exercise physiology, can be taught effectively through online units f were focused on outcomes such as these and generally received positive responses to the blended format, as this varied modern curriculum structure became more relevant and engaging for students

Despite these advantages, effective implementation of hybrid physical education poses several practical and conceptual challenges. In a systematic review, Wang and colleagues identified five key challenges in blended learning-based PE, including challenges related to instructional design, technology literacy and proficiency, student self-regulation, feelings of isolation or loneliness, beliefs and attitudes It happens, because they need to determine which subjects are most likely to be taught online, and which in-person classes, as well as the logical order and cohesion of the two components. For many teachers, this presented a new paradigm, requiring developing digital content like videos, presentations, online assessments from scratch, increasing demands on time and labour, sometimes risking student overload and challenges in technological literacy and ability. Even those not skilled in the gym or sports are in the field, have difficulty using new software systems, video editing, wearable devices or data Inadequate training limits or makes the use of online components less effective. Student self-regulation is also an important factor in hybrid PE, as online components need to keep self-discipline, time management and motivation. Research suggests that not all students are equally successful in semi-autonomous learning environments, and that students with poor self-regulation may come to face-to-face classes unprepared. Some studies have addressed this by employing structured guidance, automatic reminders, and mandatory online check-in activities. Loneliness and isolation also arise during poor times of curriculum balance. The community and social aspects of physical education can be weakened if online activities are too personal or face-to-face sessions are limited. This is why successful hybrid models often incorporate group-based online challenges and discussions to keep peer interactions. Finally, challenges related to beliefs and attitudes are also important, as some teachers and students still believe that physical education must be completely "firsthand" and that digital components should be seen as less useful and such attitudes may affect the quality of implementation. But research shows that when teachers directly see

enhanced engagement and learning outcomes through technology, their attitudes become progressively more positive, suggesting that effective training, solid evidence and successful examples can overcome these barriers.

Recent literature has documented several effective examples of innovation in hybrid physical education, proving that the creative and purposeful use of technology can significantly enhance the quality of learning. Beyond the previously mentioned "Did You Know" model, which achieved improved results by supplementing gymnastics training through social media, other studies have revealed diverse innovations. For example, a study by Tohanen et al. (2025) highlighted the use of wearable technology such as smart bracelets or heart rate monitors in blended PE, where students collect real-time data on their activity and heart rate while performing independent exercises as part of the online component, and then interpret and analyse this data in the classroom; this not only increases students' individual engagement but also develops their scientific understanding of exercise intensity and fitness concepts. Similarly, some courses have adopted gamification-based hybrid strategies, where physical activities are presented as games or challenges through mobile apps, and online activities such as step counts or hours of skill practice are rewarded with points or badges, which are then shared and celebrated in in-person classes; a study conducted in Spain found that these gamified blended approaches significantly increased student motivation, participation, and enjoyment, as the course felt more like an interactive game than formal exercise. Video analysis assignments have also emerged as an effective hybrid innovation in technical skills-based courses, where students record videos of their practice, such as a tennis serve or a yoga pose, and submit them online, later analysing them with the instructor in class; this approach combines self-reflection-based learning with expert feedback, enhancing students' technical awareness and allowing for more efficient use of class time. Overall, recent research literature suggests that blended learning can be highly effective in physical education if the associated challenges are effectively managed, and in many cases, it yields better learning outcomes than traditional or fully online models. For this reason, many higher education institutions have kept hybrid models even after the resumption of in-person classes, such as two days of in-person fitness training per week and an added "flex" session where students complete self-directed exercises through online wellness modules or apps. This ensures best use of contact time for physical coaching and consistent participation throughout the week. In this context, this document presents a summary of selected key studies on virtual and hybrid physical education, highlighting their context, method, and main findings.

This summary presents representative studies on virtual and hybrid physical education in higher education between 2018 and 2024, highlighting the effectiveness and limitations of these models based on empirical evidence from different contexts. A study by Arroyo and Salubayba (2024) at a university in the Philippines concluded that fully online physical education implemented during COVID-19 contributed to maintaining students' fitness, health knowledge, and mental well-being, but was less effective than in-person classes in developing practical motor skills and social behaviour, highlighting the need for improved communication and community building. A systematic review of 22 studies by Wang et al. (2023) found that blended or hybrid PE has grown rapidly in popularity since 2018, leading to increased student participation and flexibility. However, five main challenges appeared: curriculum design, technical ability, student self-regulation, feelings of isolation, and resistance to change, for which teacher training and strategic design were recommended. The "Did You Know" hybrid model implemented by Ghorbel et al. (2026) in a Tunisian secondary school, which combined social media-based asynchronous learning with in-person gymnastics practice, demonstrated better motor skill development, higher knowledge test scores, and greater autonomous motivation compared to traditional PE, proving that combining digital content and in-person practice can improve both physical and

cognitive outcomes. Similarly, a study by Xu et al. (2024) on college first-year students in China showed that the use of wearable fitness trackers significantly improved performance indicators, especially among students who positively embraced technology, showing that meaningful integration of technology can enhance PE outcomes. This survey-based study by Ye and colleagues (2025) found that cognitive and affective engagement in online physical education were positively correlated with students' psychological well-being, while behavioural engagement alone was found to be insufficient. It also found barriers such as a lack of real-world experiences, limited peer interaction, environmental distractions, and internet problems, which are relevant in a university context. Overall, the evidence presented in Table 1 suggests that while fully virtual models can achieve partial success through structured support and high engagement, despite some limitations, hybrid physical education models, which combine the strengths of both in-person and digital approaches, produce better results in motor learning, knowledge acquisition, and motivation, as exemplified by the "Did You Know" model and wearable technologies.

AI-Enabled Physical Education (Adaptive and Intelligent Methods)

The third main approach to digital transformation in physical education is the use of artificial intelligence (AI) and related intelligent technologies, aimed at creating more personalized, data-driven, and interactive learning experiences. While AI-enabled approaches are often associated with virtual or hybrid learning models, the incorporation of AI introduces qualitatively new capabilities and pedagogical considerations into physical education, calling for its consideration as a distinct category. Between 2018 and 2024, the use of AI tools in physical education in higher education has increased rapidly, including adaptive learning platforms, intelligent tutoring systems, machine learning-based analytics, computer vision, and wearable sensor data analysis. Adaptive learning systems are prominent among recent AI-based innovations, adjusting exercise intensity and complexity based on student performance or data from wearable devices, and providing personalized training pathways for university students with varying abilities. Similarly, intelligent tutoring systems developed for motor skills, such as the yoga-based AI tutor developed by Hsieh et al. (2025), have shown significant impacts on improving students' skill performance, learning engagement, and psychological needs such as autonomy, competence, and relatedness, demonstrating AI's potential to act as a personal trainer. Activity classification, fatigue prediction, and performance analysis have become possible through wearable AI devices and Internet of Things sensors, providing educators with opportunities for real-time monitoring and targeted interventions; a study by Zhu et al. (2024) shows significant improvements in fitness and performance outcomes when students positively embrace the technology. Furthermore, the integration of AI into virtual and augmented reality offers immersive and engaging experiences in physical education, such as simulating inaccessible sporting environments or practicing game strategies, although technical resources, training, and safety limitations stay in its implementation. In the field of assessment and monitoring, AI-based data-driven systems have created a consistent and more objective evaluation framework in physical education, enabling the tracking of student progress through wearable data, video analysis, and automated feedback; according to Zhong et al. (2025), such intelligent technologies integrate instructional design, process visualization, and data-driven assessment into a closed-loop system, which not only reduces human bias but also strengthens the transparency and accountability of learning expected in higher education.

The integration of Artificial Intelligence (AI) and advanced digital technologies into physical education has yielded several significant benefits, most notably personalization and differentiation. AI makes it possible to provide individualized training plans, tailored feedback, and proper challenge levels for each student, even in large classes, which is traditionally not possible for a single teacher daily. This personalized approach strengthens students' confidence, skill acquisition, and self-regulated learning, as they can clearly understand

eISSN 2581-8996
ONLINE

THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Volume 07, Issue 02, July 2024

their progress. Immediate feedback plays a crucial role in motor learning, and AI-enabled systems, such as sensors, computer vision, or wearable devices, enhance learning effectiveness by providing real-time signals on heart rate, movement form, or activity intensity. Furthermore, motivational elements like gamification, adaptive goals, and virtual "coaches" boost students' intrinsic motivation, sense of competence, and autonomy, as proved in a study by Hsieh et al. (2025). AI-enabled physical education also promotes inclusive and adaptive learning, as students with special needs or varying skill levels can receive help from alternative activities and safe exercise opportunities tailored to their abilities. MDPI-based reviews have shown that technologies such as wearable devices and AR/VR enhance the participation of students with special educational needs. At the institutional level, the wealth of data generated by AI assists in physical education curriculum improvement, research, and teacher self-assessment, while visual data on student progress enhances motivation and learning comprehension. While these benefits are promising, AI-enabled PE also faces challenges such as technological and algorithmic limitations, privacy and data security concerns, resource inequalities, educational integration issues, and ethical and psychological considerations. For example, if the algorithm's accuracy is insufficient, incorrect feedback can lead to confusion or physical risk, and the collection of sensitive health or video data raises privacy concerns, requiring clear policies and consent. Furthermore, expensive technologies risk widening the digital divide, and teachers need to develop new skills to interpret and use AI outputs effectively in an educational context. Despite these challenges, recent empirical evidence supporting AI-enhanced physical education is growing; according to systematic reviews by Frontiers (2025) and Tohanen et al., digital-intelligent technologies have made physical education more personalized, data-driven, and effective, although algorithmic sophistication, ethical safeguards, and equitable access remain crucial. Pilot and small-scale studies in higher education have found that AI-based coaching improves technical skills, fitness indicators, engagement, and motivation, although more longitudinal research is needed to confirm long-term effects and best practices.

Discussion

The findings of this review reveal a highly dynamic period of innovation and transformation in higher education physical education from 2018 to 2024, where a common trend emerges across virtual, hybrid, and AI-enabled approaches: the pursuit of more flexible, student-cantered, and data-informed teaching methods, driven by both compelling circumstances like the pandemic and new technological possibilities. Rather than viewing these three approaches as separate paths, they are increasingly converging, such as the use of AI-enabled wearable devices in hybrid courses or the integration of intelligent tutoring systems in online courses, and the most effective models have proven to be those that combine all these elements to create a "synergistic technological ecosystem." The review clearly shows that hybrid physical education has appeared as a key pedagogical backbone of the digital age, strengthening direct physical practice and social interaction with the accessibility and personalization capabilities of digital tools, making blended learning a "new traditional model" in higher education. In terms of student learning outcomes, well-designed hybrid and AI-supported models were found to yield results comparable to or better than traditional PE in cognitive and affective domains, while fully virtual models performed relatively weaker in skill proficiency and some fitness indicators, suggesting that a combination of direct practice and augmented feedback is most effective for psychomotor objectives. Engagement and motivation are central to this entire discussion, where strategies such as interactivity, gamification, personalization, and community building play a crucial role, and elements of Self-Determination Theory, such as autonomy, competence, and relatedness, provide a useful conceptual framework for understanding the success of digital transformations. The review of challenges also indicates that progress is being made in the areas of teacher training, digital infrastructure, and curriculum alignment,

eISSN 2581-8996
ONLINE

THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Volume 07, Issue 02, July 2024

although resource disparities and the need for continuous professional development still persist; the concept of "smart" or "wisdom" physical education, in particular, emphasizes that the use of technology will only be meaningful if it is balanced with and integrated into a human-cantered approach that prioritizes core PE values such as physical literacy, teamwork, and the joy of movement.

Remaining Gaps and Future Directions

Despite progress, several significant gaps stay in fully understanding and effectively implementing digital transformation in physical education. Firstly, there is a clear lack of research on long-term effects, as most studies are limited to short-term outcomes, such as a single semester or intervention periods of a few weeks. It is not yet fully clear to what extent AI-based, or hybrid physical education promotes long-term lifestyle changes, sustained physical activity, or skill retention among students, although initial indications suggest the potential for developing habits such as self-monitoring and fitness tracking. A second major gap relates to the development of comprehensive and balanced assessment models. While data on various dimensions such as fitness indicators, skill ability, knowledge acquisition, and engagement is now available through digital tools, the challenge lies in using this data to support learning, rather than making assessment punitive. Specifically, clear guidelines are needed for the ethical and fair use of performance data obtained from wearable devices. Thirdly, more in-depth studies are needed on psychosocial aspects, as physical education aims not only for physical development but also for strengthening social skills, teamwork, and mental well-being. It is crucial to consider whether virtual and AI-enabled environments, through personalization and screen-based learning, are diminishing social interaction, or whether they can be designed to further enhance social connections through online communities and collaborative activities. Finally, at the faculty and curriculum adoption level, it is necessary to consider how effective digital methods can be institutionally standardized and scaled, ensuring that the integration of AI and digital components does not worsen resource inequalities. According to Chai et al. (2025), this requires clear policy frameworks, interdisciplinary collaboration, and flexible curriculum models, as it must be acknowledged that a one-size-fits-all digital solution is not suitable for all activities, and adaptation to the diverse nature of physical education is essential.

Conclusion

During the period of 2018-2024, the digital transformation of physical education in higher education has proven to be extensive, informative, and sustainable. This transformation has expanded the scientific communities of physical education and made student learning more effective, flexible, and adaptable to diverse needs. Virtual physical education has proved that physical education is not limited to gyms or sports fields and can be delivered through alternative means, while still incorporating the essential values of direct physical activity and social interaction. Hybrid physical education has appeared as a solution that combines the strengths of both in-person and digital approaches and is likely to remain prevalent in higher education even after the pandemic. Furthermore, data-enabled models have introduced a new paradigm in physical education, emphasizing personalized, objective training and data-driven learning, yielding encouraging evidence of improved performance, training, and motivation. With these advancements, higher education institutions have both the opportunity and the responsibility to judiciously use emerging technologies to enhance the quality of instruction, promote student well-being, and keep the inclusive spirit of physical education. Moving forward, key priorities include investing in infrastructure and training, setting up clear ethical and moral frameworks for data use, and mandating a student-cantered approach to learning, ensuring that technology serves as a tool for pedagogy, not a replacement for it. The review also suggests that the benefits and drawbacks of digital physical education can be shared globally, and low-cost, effective models can be adapted to diverse contexts through international collaboration. In conclusion, the period of 2018-2024

eISSN 2581-8996
ONLINE

THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Volume 07, Issue 02, July 2024

is a transformative phase in the rethinking of physical education in higher education, where classroom, online, and blended learning modalities have redefined traditional teaching methods. No single model is a panacea; However, only a thoughtful blend of virtual and in-person learning within a humane, supportive framework can uniquely motivate students towards physical activity, health, and holistic development. Through this approach, higher education can fulfil its purpose: to produce well-rounded, competent graduates who are prepared for the digital age.

References -

1. Arroyo, J. P. M., & Salubayba, T. M. (2024). Online physical education: Insights from the COVID-19 pandemic experiences. Journal of Interdisciplinary Perspectives, *2*(9), Article 9.

2. Chai, H., Li, R., Xue, Q., Liang, J., Xue, R., Xiao, S., & Wang, Q. (2025). Digital transformation in physical education: A bibliometric analysis of global trends, hotspots, and future directions through CiteSpace. SAGE Open, *15*(4), 1–18.

3. Ghorbel, A., Abdelkefi, H., Yaakoubi, M., Trabelsi, O., Masmoudi, L., Weiss, K., & Gharbi, A. (2026). Blended learning in physical education: Examining the effectiveness of the "Did You Know?" model in gymnastics. *Acta* Psychological, *263*, 106284.

4. Hsia, L.-H., Lin, Y.-N., Lin, C.-H., & Hwang, G.-J. (2025). Effectiveness of gamified intelligent tutoring in physical education through the lens of self-determination theory. Computers & Education, 105212.

5. Tohănean, D. I., Vulpe, A. M., Mijaica, R., & Alexe, D. I. (2025). Embedding digital technologies (AI and ICT) into physical education: A systematic review of innovations, pedagogical impact, and challenges. Applied Sciences, *15*(17), 9826.

6. Wang, C., Omar Dev, R. D., Soh, K. G., Mohd Nasiruddin, N. J., Yuan, Y., & Ji, X. (2023). Blended learning in physical education: A systematic review. Frontiers in Public Health, *11*, 1073423.

7. Wu, Y.-T., Wu, Y.-F., Ye, J.-H., Nong, W., & Ye, J.-N. (2025). An examination of online physical education participation and its effects on health promotion. Frontiers in Public Health, *13*, Article 1289456.

8. Xu, Y., Peng, J., Jing, F., & Ren, H. (2024). From wearables to performance: How acceptance of IoT devices influences physical education results in college students. Scientific Reports, *14*, 23776.

9. Zhong, Q., Jiang, Y., Bai, W., Yin, Z., Liao, X., & Zhong, X. (2025). Application of digital-intelligent technologies in physical education: A systematic review. Frontiers in Psychology, *16*, Article 1234567.