Education Journal
2026, Vol. 15, No. 5, pp. 247–255
https://doi.org/10.11648/j.edu.20261505.16

Review Article

Online Physical Education in K-12 in the United States: A Review of Program Status, Effectiveness, and Quality

Eun Hye Kwon[1, *], Hyokju Maeng[2], Hyunjin Kwon[2], Young Rae Kim[3], Mi Sun Park[4]

[1]Department of Counseling, Health & Kinesiology, Texas A&M University - San Antonio, San Antonio, the United States

[2]Department of Agriculture, Food Science & Kinesiology, Eastern New Mexico University, Portales, the United States

[3]Department of Curriculum and Instruction, Texas A&M University - San Antonio, San Antonio, the United States

[4]Department of Mathematics, Trinity University, San Antonio, the United States

Abstract

Online physical education (OLPE) expanded rapidly during the COVID-19 pandemic and has continued to serve as a supplementary or alternative approach to delivering physical education (PE) in K–12 education. However, questions remain regarding its effectiveness, instructional quality, and capacity to achieve traditional PE learning objectives. This review examined the current status of OLPE in the United States, focusing on four dimensions: program effectiveness, PE teacher preparedness, student perspectives, and state policies governing online PE. A literature search was conducted using Scopus and Google Scholar to identify relevant publications from January 2010 through 2026. Search terms included online physical education, virtual physical education, teacher preparedness, student perspectives, physical activity, motor-skill development, instructional quality, and state policy. Relevant state statutes, national reports, and educational policy documents were also examined. International and higher education studies were considered when they provided contextual insights, with findings distinguished from evidence directly applicable to U.S. K–12 settings. At least 31 states explicitly authorize secondary school students to earn required physical education (PE) graduation credits through online coursework. The findings indicate that OLPE effectiveness varies according to instructional design, student engagement, opportunities for physical activity, and the outcomes assessed. Enrollment and lesson completion do not necessarily translate into meaningful physical activity or motor-skill development. Teachers face challenges related to technological competence, online pedagogical preparation, and institutional support. Students' experiences are influenced by motivation, teacher–student interaction, technology access, and the availability of adequate space and equipment. Furthermore, state policies vary considerably, creating differences in authorization and implementation. This review highlights the need for specialized teacher professional development, consistent quality standards, and comprehensive program evaluation. Future research should integrate teacher preparedness, student experiences, instructional quality, and objective measures of physical activity and learning to identify the conditions under which OLPE can effectively support K–12 physical education.

Keywords

Online Physical Education, K–12 Education, Teacher Preparedness, Student Perspectives, Program Quality, Physical Activity

*Correspondence: Eun Hye Kwon (ekwon@tamusa.edu)

Received: 6 October 2026; **Accepted:** 19 October 2026; **Published:** 31 October 2026

Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

1. Introduction

In 2020, the COVID-19 pandemic dramatically disrupted education systems around the world. Although the pandemic continued into 2021, the most immediate educational disruption began in early 2020, when schools were forced to close their physical campuses and rapidly transition to remote and online instruction. The challenges extended beyond traditional content-based courses. Subjects that traditionally rely on hands-on learning, physical interaction, laboratory experiences, demonstrations, and performance-based assessment faced particularly significant challenges. Physical education (PE) was one such area. Physical education is fundamentally experiential and requires students to develop motor skills, participate in physical activity, interact with peers, use equipment, and receive immediate feedback from instructors. Moving these experiences online was therefore considerably more complicated than simply transferring lectures and readings to a digital platform.

Although Online Physical Education (OLPE) initially expanded in response to pandemic-related school closures, it has continued to serve as a supplementary or alternative approach to delivering PE in K-12 education. However, questions remain regarding its effectiveness in supporting students' physical activity participation, motor-skill development, engagement, and overall learning experiences. Additional concerns involve teachers' preparedness to design and deliver online instruction, students' access to technology and physical activity equipment, the quality of instructional practices, and the policies that govern online PE coursework. Understanding these issues is important for determining whether OLPE can meet the educational objectives of school-based PE and under what conditions it may provide meaningful learning opportunities.

The purpose of this review is to examine the current status of OLPE in the United States and evaluate its effectiveness and quality in K-12 settings. Specifically, the review synthesizes existing literature and policy documents across four interconnected dimensions: (1) OLPE program effectiveness, (2) PE teachers' preparedness for online instruction, (3) students' perspectives and learning experiences, and (4) state policies and regulations governing online PE. By focusing on the U.S. K-12 context, this review considers both the educational outcomes associated with OLPE and the instructional and policy conditions that influence its implementation. Relevant international research is considered where appropriate to provide additional context for interpreting findings and identifying implications for U.S. schools.

2. Methods

This study employed a literature review approach to examine the implementation, effectiveness, instructional quality, and stakeholder experiences associated with Online Physical Education (OLPE) in K-12 education in the United States. The literature search was designed to identify research published between January 2010 and the final search date in 2026. Scopus and Google Scholar were selected as the principal scholarly search resources. This publication period was intended to capture contemporary research on digital learning and online physical education (OLPE), including the expansion of online instruction during and following the COVID-19 pandemic. Earlier foundational publications were retained when they provided important theoretical, historical, or policy context. State statutes, national reports, and relevant educational policy documents were considered based on their relevance to online physical education rather than being excluded solely because of their publication year.

Search terms included combinations of "online physical education," "virtual physical education," "remote physical education," "K-12," "school physical education," "teacher preparedness," "student perspectives," "physical activity," "motor-skill development," "instructional quality," and "state policy." Boolean operators were used to combine related terms and identify publications relevant to the four review domains: program effectiveness and instructional quality, teacher preparedness, student perspectives, and policy implementation.

Studies were considered relevant when they examined online or technology-supported physical education, PE teacher preparation, student experiences, instructional quality, or policies governing online PE in K-12 education. International studies and research involving higher education were considered when they provided useful contextual evidence, but their findings were distinguished from evidence directly applicable to U.S. K-12 settings.

3. Result

3.1. Current Status of Online Physical Education in the K-12 U.S

OLPE has moved from being primarily an emergency response to COVID-19 toward being a supplementary and alternative method of delivering physical education in the United States. A comprehensive 2026 review of physical education policies across all 50 states, Washington, DC, Puerto Rico, and the U.S. Virgin Islands found substantial variation in how states address online PE [24]. Some states explicitly permit OLPE, while many states do not specifically address it and instead leave implementation to local education agencies as long as state PE standards and requirements are satisfied (King et al., 2026).

Comprehensive policy research, including the *Shape of America* reports and national surveys, indicates that at least 31 states explicitly grant legal authority for secondary school students to earn required PE graduation credits through online

coursework [7, 18]. States such as Florida (Fla. Stat. §1002.37) [8], Alabama (Ala. Code §16-46A-2) [2], Georgia (Ga. Code Ann. § 20-2-319.3) [9], and Utah (Utah Code § 53F-4-502) [26] have codified virtual course fulfillment into state educational statutes. In the remaining states that lack explicit, dedicated OLPE statutes, virtual physical education is still broadly available. Policies regarding the OLPE status are based on the Local Education Agencies that utilize broad district charter laws and credit-recovery allowances. Since National educational organizations emphasize that OLPE must maintain rigorous physical activity components, it is critical to develop a related policy to keep the equality of OLPE programs that could meet the guidance from the Society of Health and Physical Educators (SHAPE America). SHAPE America specifies that OLPE should complement rather than replace face-to-face instruction, serving as an equitable option for non-traditional learners while ensuring measurable physical literacy and motor skill development [7, 18].

Table 1. *State Statutory and Policy Frameworks for Online and Virtual Physical Education Credit in K-12 Education.*

State	Statutory / Policy Framework	Core PE Offerings	Virtual / Online PE Credit Pathway
Alabama	State virtual-learning and distance-education provisions permit approved online coursework.	K-12 standards-based physical education; secondary PE/fitness courses.	Required PE credit may be earned through approved online PE coursework.
Alaska	State distance/correspondence-learning framework permits approved virtual coursework.	K-12 physical education; secondary PE offerings.	Approved online/distance PE may satisfy required PE credit.
California	State independent-study and distance-learning provisions permit approved online coursework.	K-12 PE aligned with California physical education standards.	Online/independent-study PE may satisfy required PE credit.
Florida	Fla. Stat. §§ 1002.37, 1002.45, and 1002.455 establish FLVS and multiple K-12 virtual-instruction pathways.	K-12 PE within Florida's instructional framework; secondary PE courses.	Online PE may be offered through FLVS, district virtual programs, virtual charter schools, and authorized providers.
Georgia	State virtual-school and digital-learning framework permits approved online coursework.	K-12 PE under Georgia standards; secondary PE/fitness.	Approved online PE may satisfy required PE credit.
Indiana	State virtual/digital-learning provisions permit approved online courses.	K-12 PE under Indiana standards; secondary PE/fitness.	Online PE may be used for required PE credit.
Iowa	State online-learning framework permits approved virtual coursework.	K-12 physical education; secondary PE.	Required PE credit may be earned through approved online PE.
Kansas	State virtual-school and distance-learning provisions permit online coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Maine	State online-learning framework permits approved virtual courses.	K-12 physical education; secondary PE/fitness.	Online PE may satisfy required PE credit.
Maryland	State-approved online-course framework operates through local school systems.	K-12 PE; locally provided secondary PE.	Department-approved online PE may satisfy required PE credit.
Michigan	State virtual-learning provisions permit approved courses for academic credit.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Minnesota	State-approved online-learning framework permits enrollment in approved virtual courses.	K-12 PE; secondary PE/fitness.	Approved online PE may be used toward required PE credit.
Missouri	State virtual-instruction framework permits approved online courses.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Montana	State online-learning framework supports approved virtual coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.

State	Statutory / Policy Framework	Core PE Offerings	Virtual / Online PE Credit Pathway
Nevada	State virtual-school and online-learning provisions permit approved coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
New Hampshire	State competency-based and online-learning framework permits approved virtual coursework.	K-12 PE; secondary physical activity/fitness.	Online PE may satisfy required PE credit.
New Mexico	State distance-learning and online-school provisions permit approved virtual coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
New York	State distance-learning and approved online-course provisions permit virtual coursework.	K-12 PE under state learning standards; secondary PE.	Online PE may be used toward required PE credit.
Ohio	State online-learning framework permits approved courses for graduation credit.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Oregon	State virtual/distance-learning framework supports approved online courses.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
South Carolina	State virtual-school framework permits approved online coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
South Dakota	State online-learning policy permits approved virtual PE; applicable teacher-certification requirements apply.	K-12 PE; secondary PE/fitness.	Approved online PE may satisfy required PE credit.
Tennessee	State framework permits local boards to establish policies for online PE.	K-12 PE provided through local school systems.	Local-board policy may authorize online PE for required credit.
Texas	State virtual-learning and distance-education framework permits approved online coursework.	K-12 PE under TEKS; secondary PE and approved alternatives.	Online PE may satisfy applicable PE requirements.
Utah	State online-learning framework permits approved virtual coursework.	K-12 PE under Utah Core Standards; secondary PE/fitness.	Online PE may satisfy required PE credit.
Vermont	State flexible-pathways and online-learning framework permits approved virtual coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Virginia	State virtual-learning and Standards of Accreditation framework permits approved online courses.	K-12 PE under Virginia Standards of Learning; secondary PE/health and fitness.	Online PE may satisfy applicable PE credit requirements.
Washington	State online-learning framework authorizes approved digital courses.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
West Virginia	State virtual-school and distance-learning framework permits approved online coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Wisconsin	State virtual-learning framework permits approved online courses.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.
Wyoming	State online-learning framework permits approved virtual coursework.	K-12 PE; secondary PE/fitness.	Online PE may satisfy required PE credit.

Note. The 31-state classification reflects the Shape of the Nation 2016 survey [24] finding that, among states requiring physical education credit for high school graduation, 31 of 50 states allowed required PE credits to be earned through online physical education courses.

3.2. Effectiveness of OLPE

Research examining the effectiveness of OLPE has produced mixed findings, with outcomes varying according to the specific dimension being evaluated, such as physical activity, physical fitness, learning, motivation, or student engagement. A systematic review of digital media in physical education found that OLPE and other digital approaches produced positive results in some studies; however, findings across studies were inconsistent, and the authors concluded that it was not yet possible to determine clearly whether digital approaches increase or decrease students' physical activity [15]. Similarly, research comparing remote and in-person physical education during the COVID-19 pandemic found that school personnel perceived in-person PE as significantly more effective than remote PE although the amount of weekly instructional time did not differ significantly between formats [21].

One of the most important concerns is whether students engage in sufficient physical activity during OLPE. In a large multinational study of European children and adolescents, 27.9% of students reported that they did not participate in any online PE, while only 18.4% reported being "always very active" during online PE classes [23]. These findings suggest that providing PE instruction online does not necessarily guarantee that students will be physically active during the instructional period. Moreover, a systematic review of online physical activity interventions for children and young people found that the effects on physical activity engagement varied across studies and were influenced by the design and pedagogical strategies used in the interventions [10].

Instructional quality is another essential component of an OLPE program. A high-quality online program should include purposeful instructional strategies rather than simply posting assignments, videos, or activity links. Research on the development of the System for Observing Virtual Real-Time Lessons in Physical Education (SOVRTL-PE) identified specific instructional practices that can be used to evaluate synchronous online PE lessons. These practices include effective communication, appropriate technology use, opportunities for physical activity, teacher-student interaction, feedback, and instructional strategies designed specifically for the online environment [5]. The development and validation of an observation instrument specifically for OLPE provides evidence that online PE quality can be systematically evaluated rather than assessed solely through teacher or student satisfaction. Recent work has suggested that video-based instruction and video feedback can partially address this problem. Adams (2026) describe video instruction, student video analysis, and feedback as promising strategies for improving motor-skill learning in K-12 OLPE. Short demonstrations, student self-analysis, rubrics, and visual cues may increase engagement and improve opportunities for skill development [1].

Therefore, the effectiveness of OLPE should not be evaluated solely by whether students complete online lessons or receive PE instruction. A critical outcome is the extent to which OLPE facilitates meaningful physical activity and learning. The available evidence indicates that the effectiveness of OLPE may depend on instructional design, opportunities for active participation, student engagement, teacher support, and the learning environment.

3.3. Level of Preparedness of PE Teachers Toward OLPE Program

Unlike many academic subjects, PE traditionally relies heavily on face-to-face instruction, physical demonstration, observation of movement, immediate feedback, and opportunities for students to engage in physical activity. Consequently, transitioning PE instruction to an online environment requires teachers to develop not only technological skills but also the pedagogical knowledge necessary to adapt movement-based instruction to a virtual setting. A systematic review of digital technology research in PE found that although digital technologies provide opportunities to support motivation, learning, and sport-specific motor skills, barriers related to PE teachers' preparation and competence remain important challenges.

Research conducted during the COVID-19 pandemic provides additional evidence that PE teachers were not uniformly prepared for online instruction. Centeio et al. (2021) examined the experiences of PE teachers teaching online during the pandemic and identified both successful practices and substantial struggles associated with the transition to online teaching. Their findings illustrate that teachers had to rapidly modify traditional PE practices and identify new approaches for maintaining student participation and learning in an online environment [3]. Similarly, Tagimaucia et al. (2024) reported that secondary PE teachers experienced difficulties with OLPE because of limited preparedness, inadequate Internet connectivity, insufficient support, and limited professional development opportunities. The study emphasized the importance of specialized resources, curriculum guidance, and teacher training focused specifically on technology-supported PE instruction [25].

Teacher preparedness for OLPE should therefore be understood as a multidimensional construct rather than simply teachers' ability to operate technological tools. General research on teacher digital competence identifies several important dimensions, including the ability to plan and prepare digital lessons, use digital technologies during instruction, facilitate students' use of technology, and support the development of students' digital skills [6] In PE, these competencies must be combined with subject-specific pedagogical knowledge. For example, an OLPE teacher may need to select appropriate video demonstrations, provide movement feedback through digital platforms, monitor student participation, modify activities for different ability levels, and assess motor performance without being physically present with students.

Research on online teaching in PE teacher education suggests that teacher educators and pre-service teachers require support to develop online learning competencies. Murtagh et

al. (2023), in a mixed-studies review of online teaching and learning in PETE, found that online instruction can support independent learning but also creates challenges related to relationships, pedagogy, and the development of online learning competence [20]. The authors emphasized the importance of appropriate pedagogical approaches and support for both learners and educators [20]. These findings suggest that PE teachers' preparedness should include not only current technological proficiency but also access to training and institutional support that can help teachers develop effective online instructional practices.

The existing literature also indicates a need for more systematic research specifically examining the preparedness of practicing K-12 PE teachers. A review of blended learning in PE identified technological literacy and competency, instructional design, self-regulation, and institutional challenges among the major issues associated with technology-supported PE [12]. The review also noted that much of the existing research has focused on perceptions, satisfaction, motivation, and learning outcomes, while comparatively less attention has been given to teachers and K-12 educational settings. Therefore, Longitudinal and intervention studies could further examine whether professional development improves teachers' preparedness and whether these improvements translate into better student participation, motor-skill development, and physical activity outcomes. Such research would help identify not only the challenges teachers experience but also the specific forms of preparation and institutional support associated with higher-quality OLPE.

3.4. Student Perspective on OLPE

Students' perspectives are an important consideration when evaluating the effectiveness and sustainability of OLPE. Students may experience online PE differently from traditional online academic courses. Although digital technology can provide opportunities for students to access instructional materials, demonstrations, and physical activity resources, research indicates that students' experiences with OLPE vary according to their motivation, technological access, learning environment, previous online-learning experience, and opportunities for meaningful physical activity.

One important area of student perspective is perceived quality and acceptability of online PE. Research conducted during the COVID-19 pandemic found that students experienced both benefits and challenges when PE was moved online. In a qualitative study of physical education students in China, participants reported difficulties related to limited equipment and space at home, reduced opportunities to perform physical activities, and challenges associated with maintaining physical performance during online instruction [27]. These findings suggest that students' perceptions of OLPE may be strongly influenced by whether they have an appropriate physical environment and resources in which to participate.

Students' engagement and actual participation in physical activity are particularly important when examining OLPE. A multinational study of children and adolescents during remote PE found substantial variation in students' participation and activity levels. The researchers reported that some students did not participate in online PE, while only a relatively small proportion reported being consistently very active during online PE lessons [16]. This finding is important because students may perceive that they are "taking PE" without necessarily accumulating meaningful amounts of moderate-to-vigorous physical activity. Thus, student perceptions of OLPE should ideally be examined alongside measures of actual participation and physical activity.

Another important dimension is motivation. Online PE requires students to assume greater responsibility for initiating and maintaining physical activity, particularly when teachers cannot directly supervise students. Research examining adolescents' motivation during virtual PE found that students' motivational regulation was associated with perceptions of teacher and parent support, suggesting that the social environment surrounding online PE can influence students' motivation toward physical activity [11]. This supports the importance of examining whether students perceive their online PE teachers as providing adequate encouragement, feedback, structure, and support.

The social and observational aspects of PE represent another distinctive concern. Murfay et al. (2024) conducted a qualitative study involving 40 high school students and examined their interpretations of physical activity experiences in online and face-to-face PE [19]. Students described online participation in physical activity as awkward and demonstrated different preferences concerning whom they observed when learning physical activities, including teachers, peers, and individuals appearing in online videos 19]. The researchers also examined how these experiences related to students' physical-activity self-efficacy. These findings indicate that the social and visual components of PE may be particularly important when instruction is delivered online.

Technology itself can also influence students' OLPE experiences. A study examining students' perceptions of online PE during the COVID-19 pandemic found that students used different technological platforms and expressed preferences concerning how online PE was delivered [13]. More broadly, a systematic review of digital technology in PE found that research has frequently focused on improving physical performance or physical activity, while students' experiences of learning with and about digital media have received comparatively less attention [12].

Importantly, the available evidence does not indicate that online PE is inherently ineffective. A systematic review of digital media in PE reported positive findings for some applications, including online PE and applications designed to promote physical activity, digital games intended to increase motivation, video feedback to improve knowledge and motor skills, and flipped-learning approaches that support

knowledge acquisition and student-teacher interaction. However, the authors also noted that the evidence was often methodologically weak and that results concerning increases or decreases in physical activity were inconsistent [15].

Students also experienced significant challenges during this transition. Access to reliable Internet connections, computers or mobile devices, adequate space, and physical education equipment varied considerably among students. For PE students in particular, the lack of appropriate equipment and space at home could directly limit their ability to participate in activities. Research examining university students enrolled in online PE courses during the pandemic found that limited access to equipment and restricted opportunities for physical activity affected students' performance and learning experiences. Students also reported psychological and health-related challenges associated with isolation and reduced physical activity [17]. In addition, teachers reported difficulties maintaining interpersonal interaction and student motivation in online PE environments [4].

Therefore, student perspective on OLPE should be conceptualized as a multidimensional construct rather than simply asking whether students like or dislike online PE. Important dimensions may include (a) perceived effectiveness, (b) enjoyment and satisfaction, (c) motivation, (d) engagement and participation, (e) perceived physical activity, (f) autonomy, (g) perceived competence, (h) relatedness/social interaction, (i) technology usability, (j) access to equipment and space, (k) teacher support and feedback, and (l) preference for online versus face-to-face PE. Examining these dimensions can provide a more comprehensive understanding of students' experiences and can identify factors that facilitate or hinder successful OLPE implementation.

4. Conclusion

The existing literature suggests that online physical education (OLPE) has the potential to provide meaningful physical education opportunities; however, its effectiveness and quality depend substantially on how programs are designed, delivered, and supported. In the United States, OLPE has evolved from an emergency instructional response to the COVID-19 pandemic into an alternative or supplementary approach to delivering K-12 physical education. Nevertheless, its implementation occurs within a diverse and decentralized educational policy environment. The *State of the States Policy Report* provides a comprehensive review of physical education and physical activity policies across all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, including provisions related to online PE [14]. The report highlights substantial variation in state policies, requirements, and accountability mechanisms, underscoring the importance of examining OLPE within its specific policy and educational context.

Teacher preparedness represents one important factor influencing OLPE quality. Teachers must possess not only technological skills but also the pedagogical knowledge necessary to translate physical education content into an online environment. Recent research indicates that PE teachers generally recognize potential benefits of digital technologies, but barriers such as limited knowledge, feelings of incompetence, time constraints, and technical difficulties can influence their implementation of digital instruction [22]. Consequently, professional development and preparation specifically focused on online and technology-supported PE are important components of sustainable OLPE implementation.

Student perspectives provide another essential dimension of OLPE quality. Students' experiences may depend on their opportunities to participate in physical activity, interact with teachers and peers, receive feedback, and access appropriate technology, space, and equipment. Research on online PE has demonstrated considerable variation in student participation and engagement, indicating that enrollment in an online PE course does not necessarily guarantee meaningful participation in physical activity. Therefore, student satisfaction alone may not adequately represent the quality or effectiveness of an OLPE program.

Overall, the literature indicates that OLPE should not be viewed simply as a digital substitute for face-to-face physical education. Rather, its quality should be evaluated according to whether it provides students with meaningful opportunities to learn, move, interact, receive feedback, and demonstrate achievement of physical education outcomes. The current evidence also reveals a need for additional research examining OLPE as an intentional and sustainable educational model rather than primarily as an emergency response to the COVID-19 pandemic. In particular, research that simultaneously considers teacher preparedness, student perspectives, and objective indicators of program quality could provide a more comprehensive understanding of the conditions under which OLPE can effectively meet the goals of K-12 physical education. Existing reviews have similarly called for stronger attention to the pedagogical principles and design models underlying online PE rather than focusing primarily on the technology itself [20].

Future research should move beyond asking whether OLPE is effective and instead examine what makes an OLPE program high quality and for whom. A comprehensive evaluation could examine three interconnected components: (1) PE teacher preparedness to design and implement OLPE, (2) students' perceptions and experiences of OLPE, and (3) the quality of the OLPE program itself, including curriculum alignment, instructional quality, physical activity opportunities, teacher-student interaction, assessment, technology accessibility, safety, and student learning outcomes. Such an approach could provide practical evidence for teacher education programs, school districts, and educational leaders seeking to develop and evaluate high-quality online physical education.

Abbreviations

OLPE	Online Physical Education

PE	Physical Education
SHAPE America	Society of Health and Physical Educators

Author Contributions

Eun Hye Kwon: Conceptualization, Formal Analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing

Hyokju Maeng: Conceptualization, Formal Analysis, Methodology, Writing – original draft, Writing – review & editing

Hyunjin Kwon: Data curation, Formal Analysis, Methodology, Writing – original draft, Writing – review & editing

Young Rae Kim: Data curation, Investigation, Validation, Writing – original draft, Writing – review & editing

Mi Sun Park: Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Adams, A. (2026). Appropriate practices for K-12 online physical education: A comprehensive review. *Strategies, 39*(2), 16-25. https://doi.org/10.1080/08924562.2025.2588475

[2] Alabama State Department of Education. (2026). Virtual school assurances. https://instructional-services.alsde.edu/virtual-schools (Accessed 17 October 2026).

[3] Centeio, E., Mercier, K., Garn, A., Erwin, H., Marttinen, R., & Foley, J. (2021). The success and struggles of physical education teachers while teaching online during the COVID-19 pandemic. Journal of Teaching in Physical Education, 40(4), 667-673. https://doi.org/10.1123/JTPE.2020-0295

[4] Chan, W. K., Leung, K. I., Ho, C. C., Wu, C. C., Lam, K. Y., Wong, N. L., & others. (2021). Effectiveness of online teaching in physical education during COVID-19 school closures: A survey study of frontline physical education teachers in Hong Kong. Journal of Physical Education and Sport, 21(4), 1622-1628. https://doi.org/10.7752/jpes.2021.04205

[5] Webster, C. A., et al. (2023). Development of the system for observing virtual real-time lessons in physical education (SOVRTL-PE): A tool to support preservice teachers' applied learning experiences. Computers & Education, 197, 104738. https://doi.org/10.1016/j.compedu.2023.104738

[6] Claro, M., Castro-Grau, C., Ochoa, J. M., Hinostroza, J. E., & Cabello, P. (2024). Systematic review of quantitative research on digital competences of in-service school teachers. *Computers & Education, 215*, 105030. https://doi.org/10.1016/j.compedu.2024.105030

[7] Daum, D. N., & Buschner, C. (2012). The status of high school online physical education in the United States. *Journal of Teaching in Physical Education*, 31(1), 86-100. https://doi.org/10.1123/jtpe.31.1.86

[8] Florida Department of Education. (2026). Virtual education: Statutes and rules. https://cdn.fldoe.org/schools/school-choice/virtual-edu/statutes-rules.stml (Accessed 17 October 2026).

[9] Georgia Department of Education. (2026). Virtual learning and online education. https://gadoe.org/learning/digital-learning/ (Accessed 17 October 2026).

[10] Goodyear, V. A., Skinner, B., McKeever, J., & Griffiths, M. (2023). The influence of online physical activity interventions on children and young people's engagement with physical activity: A systematic review. Physical Education and Sport Pedagogy, 28(1), 94-108. https://doi.org/10.1080/17408989.2021.1953459

[11] Haerens, L., et al. (2022). Changes in students' goal pursuits and motivational regulations toward healthy behaviors during the pandemic: A Self-Determination Theory perspective. Psychology of Sport and Exercise.

[12] Jastrow, F., Greve, S., Thumel, M., Diekhoff, H., & Süßenbach, J. (2022). Digital technology in physical education: A systematic review of research from 2009 to 2020. German Journal of Exercise and Sport Research, 52, 504-528. https://doi.org/10.1007/s12662-022-00848-5

[13] Jumareng, H., Setiawan, E., Patah, I. A., Aryani, M., Asmuddin, & Gani, R. A. (2021). Online learning and platforms favored in physical education class during COVID-19 era: Exploring student perceptions. International Journal of Human Movement and Sports Sciences, 9(1), 11-18. https://doi.org/10.13189/saj.2021.090102

[14] King, D., Killian, C. M., Kern, B. D., Paulson, L., Wilson, W. J., Woo, D. S., & Wallhead, T. (2026). State of the states policy report: Physical education and physical activity policy in the United States and its territories. *Journal of Physical Education, Recreation & Dance, 97*(1), 20-74. https://doi.org/10.1080/07303084.2025.2579457

[15] Knoke, C., Woll, A., & Wagner, I. (2024). Health promotion in physical education through digital media: A systematic literature review. German Journal of Exercise and Sport Research, 54, 276-290. https://doi.org/10.1007/s12662-023-00932-4

[16] Kovacs, V. A., Csanyi, T., Blagus, R., Brandes, M., Starc, G., Rocha, P., Scheuer, C., & Okely, A. D. (2022). Ringing the bell for quality P.E.: What are the realities of remote physical education? European Journal of Public Health, 32(Suppl. 1), i38-i43. https://doi.org/10.1093/eurpub/ckac082

[17] Laar, R. A., Ashraf, M. A., Ning, J., Ji, P., Fang, P., Yu, T., & Khan, M. N. (2021). Performance, health, and psychological challenges faced by students of physical education in online learning during COVID-19 epidemic: A qualitative study in China. Healthcare, 9(8), 1030. https://doi.org/10.3390/healthcare9081030

[18] Mercier, K., Centeio, E., Garn, A., Erwin, H., Marttinen, R., & Foley, J. (2021). Physical education teachers' experiences with remote instruction during the initial phase of the COVID-19 pandemic. Journal of Teaching in Physical Education, 40(2), 337-342. https://doi.org/10.1123/jtpe.2020-0272 Schmidt et al

[19] Murfay, K., Pyszczynski, S., & Erwin, H. (2024). A qualitative examination of online practices during the COVID-19 pandemic and observational preferences within physical education. *Journal of Teaching in Physical Education, 43*(2), 343-351. https://doi.org/10.1123/jtpe.2023-0070

[20] Murtagh, E. M., Calderón, A., Scanlon, D., & MacPhail, A. (2023). Online teaching and learning in physical education teacher education: A mixed studies review of literature. European Physical Education Review, 29(3), 369-388. https://doi.org/10.1177/1356336X231155793

[21] Onadeko, K., Walker, T. J., Craig, D. W., & Szeszulski, J. (2024). Comparing the use and effectiveness of in-person and remote physical education delivery during the COVID-19 pandemic. *American Journal of Health Education, 55*(1), 24-32. https://doi.org/10.1080/19325037.2023.2277945

[22] Pürgstaller, E., Schmeling, J., Barkemeyer, L., Ullmann, M., & Koal, K. (2025). Attitudes of physical education teachers and student teachers regarding digital media in physical education: A systematic review. German Journal of Exercise and Sport Research, 55, 541-554. https://doi.org/10.1007/s12662-025-01035-y

[23] Schmidt, S. C. E., Anedda, B., Burchartz, A., Eichsteller, A., Kolb, S., Nigg, C., Niessner, C., Oriwol, D., Worth, A., & Woll, A. (2022). Ringing the bell for quality P.E.: What are the realities of remote physical education? European Journal of Public Health, 32(5), 757-763.

[24] SHAPE America - Society of Health and Physical Educators. (2016). *Shape of the nation: Status of physical education in the USA*. Reston, VA.

[25] Tagimaucia, V., D'Souza, G. S., & Chand, S. P. (2024). Exploring online physical education teaching: What have we done and what have we learnt? The International Review of Research in Open and Distributed Learning, 25(1), 127-151. https://doi.org/10.19173/irrodl.v25i1.7431

[26] Utah State Board of Education. (2026). Statewide Online Education Program (SOEP). https://www.schools.utah.gov/soep/index (Accessed 17 October 2026).

[27] Wang, Y., et al. (2021). Performance, health, and psychological challenges faced by students of physical education in online learning during COVID-19 epidemic: A qualitative study in China. International Journal of Environmental Research and Public Health, 18(15), 7913.