

PAPER

Elevating Physical Education Teacher Through Technology Integration

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ABSTRACT

This paper explores how the integration of educational technology (EdTech) has been incorporated into the field of physical education (PE) and explores the difficulties encountered by Physical Education teachers (PETs) in successfully implementing technology. Through a systematic secondary literature review spanning the past decade, this paper identifies several key challenges, including unpreparedness, a trial-and-error approach, a shift in teaching priorities, and variations in teacher effectiveness. These challenges underscore the pressing need for readiness, adaptability, and preparation in the face of unforeseen disruptions, particularly in the context of online instruction. This study presents substantial recommendations to address these issues, emphasizing the pivotal role of technology-infused teacher education programs and advocating for Physical Education teachers' education (PETE) faculty to embrace technology leadership. By implementing these recommendations, PETE programs can better equip preservice teachers and faculty members to harness technology for more effective learning experiences. Consequently, this endeavor aims to elevate the quality of PE in our increasingly digitalized era.

KEYWORDS

Physical education, education teacher, technology integration, educational technology, online instruction

1 INTRODUCTION

Recent technology developments in the field of physical education (PE) have had significant effects on instruction and learning. Similar developments in teaching approaches and evaluation strategies are paralleled by assessment techniques. The PE community has expressed a particular interest in exploring how technology can affectively provide instructional educational content, evaluate student learning, and support reflective practices [1], [2].

One prominent application of technology in PE is digital game-based learning, which has proven to be highly efficient across all educational stages, including both

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traditional classroom settings and online environments. It effectively addresses evolving educational needs, offers advantages to educators and learners alike, and enhances overall educational standards [3].

However, despite the significant potential of technological advances in education, the successful incorporation of technology into teaching is influenced by teachers' past socialization experiences and individual beliefs. In the context of PE, technology remains significantly underutilized [4]. When employed, it is often relegated to an ancillary role, such as for classroom management, rather than serving as a pedagogical tool [5]. It also requires assistance in tackling substantial obstacles, which encompass elevated dropout rates and limited levels of learner engagement in various educational tasks [6]. The COVID-19 pandemic represents the most formidable obstacle ever encountered by any national education system [7]. However, this transition has had adverse consequences regarding physical education PE, including diminished physical activity levels, the absence of social and emotional support for students, and a decline in students' motivation to participate in sports [8], [9] [10]. Additionally, socio-political contexts within schools can marginalize PE, further complicating the adoption and application of relevant technologies [11].

Pre-service physical education instructors frequently encounter limited opportunities to become familiar with instructional technologies during their previous educational experiences, which can hinder effective technology integration. Moreover, school cultures may pose barriers to proficient instructional technology utilization. This presents a challenge for PET education programs (PETEP) in their efforts to adequately prepare future educators [12]. To address these challenges, PETEP must undertake two key tasks. Firstly, they must guide preservice teachers in critically examining their initial beliefs regarding PE, the use of instructional technologies, and their role in education. Secondly, these programs must ensure that preservice teachers acquire the essential Technological Pedagogical Content Knowledge (TPACK) to proficiently employ technology, all while fostering sociopolitical skills to navigate school environments that may not fully recognize the value of PE.

Despite the growing integration of technology in various educational domains, there is a notable lack of comprehensive research that specifically addresses the barriers and challenges faced by preservice physical education teachers (PET) in effectively incorporating technology into their teaching methods. While there are limited studies focused on delivering Physical Education teachers' education (PETE) online [13] [14], none of these studies delve into the significant challenges associated with this approach or provide solutions to effectively teach PETE in an online environment.

Technology has become increasingly important in education [15], [16], and through its incorporation, students are evolving within a data-driven, digitalized learning environment [17]. It offers a learning environment that fosters genuine learning experiences, creates a conducive setting for achieving desired learning goals [18], and promotes a more positive approach to knowledge discovery and review while emphasizing the pivotal role of students [19]. Its application within the context of PE is not as well-documented or understood. The existing literature primarily focuses on technology integration in general education, leaving a significant gap in our understanding of the unique hurdles faced by future PE instructors. This paper stands out from existing literature by focusing specifically on the barriers and challenges faced by preservice PET in incorporating technology into their teaching methods. By delving into these specific challenges, the paper aims to provide practical recommendations that can empower preservice teachers to effectively utilize technology, ultimately enhancing the quality of PE. This targeted approach distinguishes the paper and underscores its potential to make a meaningful contribution

to the field of education, bridging the gap in our understanding of technology integration in the realm of PE.

1.1 Purpose of paper

The aim of this paper is to identify and comprehensively analyze the specific barriers and challenges encountered by preservice PET when endeavoring to integrate technology into their teaching practices. By addressing the barriers and challenges faced by educators and preservice teachers, we can pave the way for a more effective and technology-enhanced approach to PE and offer recommendations for reintegrating educational technology (EdTech) into PE, ensuring optimal benefits in our digitized world.

1.2 Value of the paper

This paper focuses on a critical topic in education, particularly as it relates to physical education. It draws attention to the difficulties and roadblocks that preservice PET must overcome when incorporating technology into their instruction. Our study has the potential to offer useful ideas for enhancing the integration of EdTech in PE by addressing these obstacles and difficulties. Both present educators and preservice teachers can gain from these suggestions, which will enable them to use technology in the classroom more skillfully.

2 LITERATURE REVIEW

2.1 The intersection of digital technology and pedagogical theories in PETE

Digital technology has garnered substantial attention in the realm of PE, both in research and practical applications [20], [21]. The majority of studies in the field of teacher education have mostly concentrated on investigating the use of digital resources, like video or multimedia, to enhance topic knowledge and support in-class instruction [22]. For instance, teacher educators utilized video clips showcasing knowledge, skills, and instructional techniques [23].

More recently, there has been growing interest in engaging pre-service teachers as creators of educational content. This approach is viewed as a more immersive way of teaching and promoting active learning [24] [25]. Connecting theoretical concepts to practical applications and demonstrating the real-world relevance of ideas beyond the classroom have been identified as some of the motivations behind this pedagogical shift [24]. A similar rationale also applies to the utilization of instant messaging (So, 2016) or mobile applications [26] in teaching. Student-generated content is recognized as a unique learning activity that has a significant impact on specific cognitive functions and advanced thinking processes [27]; it remains a relatively underexplored area within the context of pre-service teacher (PET) education.

Connectivism, as an instructional theory, offers various indicators that can evolve established learning theories like constructivism [28], adapting them for effective teaching and learning in our interconnected world [29]. Connectivism presents distinct technological opportunities, allowing learners to actively engage with a collaborative body of knowledge designed for sharing [28].

In line with the principles of self-determination theory (SDT), enriching learning environments are those that offer choices, foster initiative, and encourage engagement in tasks [30].

Research also indicates that integrating active learning and student-centered strategies into teaching approaches consistently correlates with increased intrinsic motivation [31], enhanced self-efficacy [32], and improved academic achievement [33].

2.2 Strategies and considerations for effective integration of technology in PETEP

PETEP has experienced growing encouragement to incorporate technology effectively into its curriculum to enhance content delivery and improve student learning experiences [34]. While comprehensive instances of technology integration within undergraduate PE curricula are limited in the literature, certain programs intentionally introduced digital technologies into specific courses and field experiences. Research studies have highlighted various roles that technology serves in PET education, such as facilitating information sharing, engaging students, fostering collaboration, and assessing learning outcomes [35].

While sporadic use of technology in certain courses or experiences may create awareness of different tools among pre-service teachers, experts argue that a more effective approach involves conceptualizing technology based on its function rather than its specific type or device [36]. By doing so, the emphasis shifts towards promoting inquiry, supporting teacher decision-making, and fostering student-centered pedagogy. PETEP aims to implement these principles systematically throughout the entire curriculum.

However, this conceptualization of technology based on function requires thorough and critical assessment of how technology can serve as a pedagogical or instructional tool. This is crucial to avoid viewing it as irrelevant or disconnected from the intended learning objectives. Certain PE professionals and teacher education faculty face a considerable challenge in grasping the effective connection between pedagogy and technology. Earlier studies have indicated that pre-service teachers' involvement in digital methods has been low when these methods do not encourage active learning and tend to be centered around the teacher [37].

Web-based platforms, such as social media, have been integrated into PETEP to encourage the formation of communities of practice among pre-service teachers, promote student-centered learning, and enhance co-learning opportunities for both students and faculty [37].

Faculty members should be very intentional about how they use technology into their programs. It is crucial to consider both the potential impact and usefulness of any tool. The important programmatic and instructional goals that must be at the center of this crucial decision-making process should serve as the basis for such decisions.

2.3 Proposed approach

The proposed approach involves conducting a comprehensive systematic literature review, drawing information and insights from reputable sources in the field.

3 METHOD

In this paper, I have employed the systematic secondary literature review method, a method that has gained prominence in the field of technology research. Johnston [38] recognizes it as a methodology whose significance is growing. Xiao and Watson [39] underscore the necessity of having a clear understanding of the boundaries of knowledge in order to advance it. They emphasize that a comprehensive review of relevant literature provides insights into the scope and depth of existing work, helping identify areas ripe for further exploration. To effectively conduct this paper, it is crucial to precisely define the research problem and establish clear definitions for key terms. See “Figure 1”.

The three databases, Scopus, Google Scholar, and PubMed, were selected because they were relevant to the research topic and had scholarly articles on the issue available.

The inclusion and exclusion criteria involve considering research papers published within the past decade. Preference is given to reputable academic sources, including highly cited journals. Following a systematic literature review approach, identified papers were then categorized based on the main themes of this paper.

The systematic review process involved an initial identification of (N = 202) records through database searching. After the removal of duplicates, (N = 120) unique records remained. These records were subsequently screened, resulting in the exclusion of (N = 40) records that did not meet the inclusion criteria. From the remaining pool, (N = 16) full-text articles were assessed for eligibility, with (N = 10) of them ultimately being excluded. Finally, the systematic review included a total of (N = 6) studies that met the criteria for inclusion.

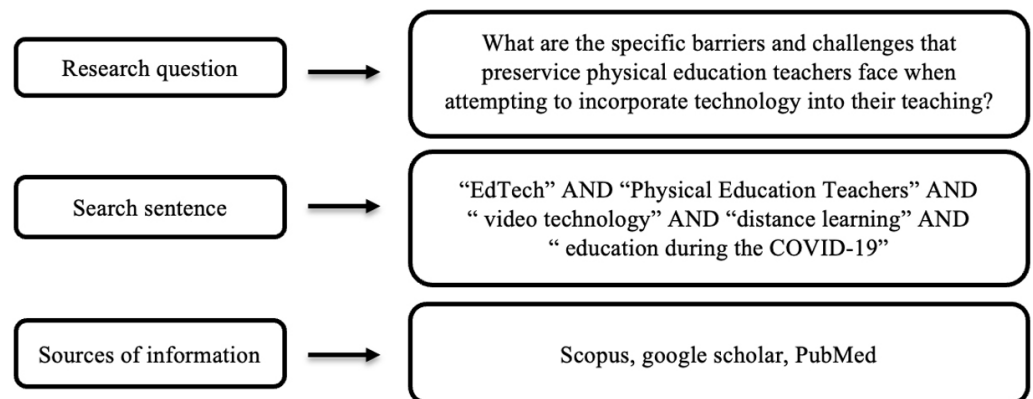


Fig. 1. Method of study

4 RESULTS AND DISCUSSION

4.1 Challenges to teaching Online Physical Education (OPE)

The conducted study provides light on the particular and significant difficulties that the field of physical education (PE) encountered during its shift to online instruction, a change that was principally prompted by the exceptional circumstances surrounding the COVID-19 epidemic. These difficulties are unique in that they require converting bodily activities which by their very nature involve emotional experiences and physical presence into a virtual classroom environment while ensuring

that the educational experience stays relevant [40]. The novelty of our findings lies in several key aspects:

1. **Unpreparedness and Trial-and-Error Approach:** The abrupt shift to OPE classes left educators largely unprepared, grappling with unfamiliar teaching methods, and relying on trial-and-error approaches. This uncharted territory was exacerbated by the absence of well-established online teaching strategies [41]. This unique challenge, born out of the urgency imposed by the pandemic, underscores the need for comprehensive preparedness in the face of unforeseen disruptions.
2. **Shift in Priorities:** The study underscores that in the context of OPE, the initial focus should be on imparting fundamental PE concepts and equipping students for active participation in the virtual classroom. This shift in priorities towards teaching the fundamentals, before delving into the importance of physical activity for health, represents a unique pedagogical adaptation necessitated by the online environment [42].
3. **Variability in Teacher Effectiveness:** The varied effectiveness of teachers in online classes, stemming from differences in prior online content knowledge and access to necessary equipment and software for content creation, is an important aspect of our findings. This variability emphasizes the unique challenges posed by technology integration and there is a requirement for continuous professional development and assistance for educators in this particular field [43].

In summary, our paper not only unveils the specific hurdles confronted by the field of PE during its transition to online instruction but also underscores the urgency for preparedness, readiness, and adaptation in the face of unforeseen disruptions. This study contributes to the domain's knowledge base by shedding light on how OPE can effectively communicate the value of physical activity for maintaining good health in novel ways. Furthermore, the generalizability of these findings extends beyond the immediate context of the COVID-19 pandemic, as online and technology-enhanced learning are anticipated to remain pertinent in the field of PE. This, in turn, emphasizes the enduring significance of our paper, providing valuable insights for both academic researchers and practitioners. Our findings serve as a foundational platform for future endeavors aimed at elevating the quality and effectiveness of OPE, not only in times of crisis but as an integral part of the evolving educational landscape.

4.2 Major recommendations

Currently, PETEP must demonstrate its ability to adequately prepare and empower people. Give preservice teachers the tools they need to create technologically enhanced learning experiences. Preservice teachers are exposed to excellent faculty modeling to achieve this goal and actively engage in hands-on practice using a variety of digital tools, producing beneficial mastery experiences [44]. The author of this research acknowledges the growing significance and applicability of technology in PETE and has made some significant recommendations. These suggestions emphasize the necessity for PETE faculty to be technology leaders in addition to the shift towards a more technologically enhanced PETEP. Faculty members at PETE should actively pursue education and training. This important suggestion is focused on:

1. **Encourage research focused on faculty and in-service technology utilization and implementation:** This involves conducting research to understand how

technology is currently being used by faculty and in-service PET. It also includes investigating the effectiveness of different technology applications and identifying areas where further professional development is needed.

2. Create tailored professional development programs specifically for (PE) teachers' education faculty to enhance their proficiency in technology knowledge and skills: Faculty members in PETEP need to possess the essential knowledge and skills for proficiently incorporating technology into their instructional practices. Designing targeted professional development programs tailored to their needs can help them become technology leaders in the field.
3. Outline the recommended approaches for integrating technology into a PE Teaching teachers' education program: Developing guidelines and best practices for incorporating technology in PETEP can ensure that technology integration is purposeful, effective, and aligned with educational goals. These guidelines should address diverse technology tools and methods for integrating them seamlessly into the curriculum.
4. Enhance backing and resources for integrating technology into PETE and PE, provided by governing bodies: To successfully implement technology-enhanced learning experiences, support and resources are necessary from educational governing bodies. This includes providing funding, infrastructure, and policies that promote the integration of technology in PETEP and PE in general.

By implementing these major recommendations, PETEP can better prepare preservice teachers to leverage technology for meaningful and effective learning experiences. Additionally, it can empower faculty members to become technology leaders, driving positive change in the field of PE.

Regarding its application, the guidelines stress how crucial it is to incorporate technology into PETEP and support faculty growth in this area. By doing this, teacher preparation may more effectively meet the requirements of online learning and give educators the tools they need to successfully traverse these settings.

5 CONCLUSION

This paper has delved into the issue of integrating technology into PETE programs. It has highlighted the challenges and barriers faced by preservice PET when incorporating technology into their teaching methods, shedding light on the unique hurdles posed by the transition to online instruction during the COVID-19 pandemic. Moreover, this paper has proposed major recommendations aimed at improving technology integration in PET education. The theoretical contributions of this paper are manifold; it has emphasized the need for pre-service teachers to critically examine their beliefs about PE, instructional technologies, and their role in education. Furthermore, it underscores the importance of TPACK and sociopolitical skills for navigating educational environments that may not fully recognize the value of PE. Additionally, the study has drawn attention to the role of technology as a pedagogical tool rather than a mere classroom management aid. While the paper has provided valuable insights, it is essential to acknowledge its limitations. The study primarily focuses on challenges related to OPE, with a particular emphasis on the COVID-19 pandemic. Future research could explore the long-term effects of technology integration in PE and investigate additional challenges that may arise in different educational contexts. In summary, this paper contributes to the field of education by addressing a pressing issue and providing practical recommendations for enhancing

technology integration in PET education. By implementing the major recommendations outlined in this paper, PETEP can better prepare preservice teachers and faculty members to effectively use technology, ultimately elevating the quality of PE in our increasingly digitized world. This study serves as a foundational platform for future endeavors aimed at improving online and technology-enhanced learning experiences in the field of PE.

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