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Enhancing Basketball Education through Digital Learning Materials: A Study on Online Teaching in Physical Education Programs

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Abstract:

This study explores the design and implementation of digital learning materials (DLMs) in online basketball teaching for undergraduate students of the Faculty of Physical Education at Ho Chi Minh City University of Education. Grounded in the pedagogical principles of Decision No. 1503/QĐ-ĐHSP and leveraging the opportunities presented by Industry 4.0, the research aims to enhance students' technical skills and self-directed learning capabilities.Utilizing a PDCA (Plan-Do-Check-Act) cycle, the study develops six DLMs, including video tutorials, interactive presentations, and online quizzes. These resources were integrated into the basketball curriculum and evaluated through practical application. Surveys of 20 instructors reveal that only 5% actively design their own DLMs, while 40% rely on pre-existing materials, highlighting the need for greater adoption and innovation in digital pedagogy.The results demonstrate that the use of DLMs improves students' comprehension of technical skills, self-study abilities, and learning engagement. The findings underscore the necessity of combining traditional teaching methods with digital resources to meet the evolving demands of physical education in the digital age. This study offers valuable insights for expanding digital education in practical courses and optimizing instructional strategies for future applications.

Keywords: basketball, digital learning materials, online teaching, physical education.

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Introduction

The rapid advancement of technology in the era of Industry 4.0 has revolutionized education, requiring significant shifts in teaching methodologies to integrate digital tools and enhance learning experiences (Mayer, 2009). In Vietnam, the Ministry of Education and Training (MOET) has emphasized the role of digital transformation in teaching through regulations such as Circular No. 32/2018 and Circular No. 09/2021, which advocate for blended

learning approaches in various educational domains, including physical education (MOET, 2018). Within this context, the use of digital learning materials (DLMs) in teaching sports, particularly basketball, has gained increasing attention for its potential to improve both learning outcomes and practical skill acquisition.

Basketball, as a dynamic and multifaceted sport, demands a pedagogical approach that combines technical skill development with cognitive and strategic understanding. Traditional teaching methods, while effective in demonstrating techniques, often face limitations in maintaining engagement and addressing diverse learning needs. Recent studies (Kao & Luo, 2020; Ahmed et al., 2023) have highlighted the benefits of multimedia-assisted and online learning in fostering interactive and personalized educational experiences. By utilizing digital platforms and resources, educators can provide flexible, student-centered learning environments that encourage active participation and self-paced practice.

At the University of Education in Ho Chi Minh City, the physical education faculty has initiated the design and implementation of DLMs tailored for basketball instruction. These materials align with the curriculum objectives outlined in Decision No. 1503/QĐ-ĐHSP, which prioritize competency-based learning and digital literacy for students pursuing careers in education. The integration of DLMs addresses the dual goals of enhancing technical proficiency in basketball while equipping students with digital competencies critical for modern teaching practices (Le, 2023).

Despite the promising applications of DLMs, challenges persist in their design and deployment. Factors such as the alignment of content with learning outcomes, the usability of digital tools, and the adaptability of resources to varied learning contexts must be critically examined (Kenioua & Berkat, 2021). This study explores the development and application of DLMs in online basketball courses for undergraduate physical education students, aiming to bridge theoretical concepts with practical implementation. By examining the impact of these materials on learning outcomes, this research contributes to the broader discourse on digital innovation in physical education and provides insights for future advancements in the field.

RESULTS

Analysis and Synthesis of Materials

The design of DLMs for the basketball module in the Physical Education (PE) program at Ho Chi Minh City University of Education (HCMUE) follows a systematic approach tailored to the professional characteristics of the field. The study addresses urgent requirements in pedagogy by investigating theoretical foundations to define content, procedures, and principles for designing DLMs in online teaching. This ensures both theoretical rigor and practical applicability, equipping students with industry-specific competencies upon graduation.

The integration of technology in education, particularly in the era of Industry 4.0, requires leveraging technological tools to support knowledge acquisition. This perspective is highlighted in Circular No. 32/2018, which introduces a curriculum for general education in PE, and Circulars No. 08/2021 and 09/2021 from the Ministry of Education and Training, which establish guidelines for online teaching management in educational institutions.

Based on Decision No. 1503/QĐ-ĐHSP (August 27, 2021), the basketball curriculum is developed to meet learning outcomes while adhering to principles such as minimizing extraneous processes, managing core cognitive processes, and encouraging knowledge recall. These principles are coupled with theoretical and methodological guidelines in sports science to optimize DLM formats. The classification of DLMs includes dynamic and static visuals (e.g., videos, infographics) and practical content tailored to specific educational goals. For teaching motor skills, video-based DLMs are particularly effective as they facilitate error correction and simplification of complex actions.

In addition, online assessments (e.g., Google Forms) and digital presentations can evaluate initial knowledge, enhance engagement, and support group-based learning activities. Effective integration of DLMs ensures that students not only master technical skills but also improve their methodological and communication abilities, preparing them for professional teaching roles.

Survey Results on Practical Implementation

During the teaching of practical modules, particularly basketball, at HCMUE, it is evident that DLMs play a crucial role in supporting both teaching and learning processes. They enable students to consolidate technical skills,

develop self-learning strategies, and improve their ability to effectively communicate and teach course content. The combination of face-to-face teaching and online learning significantly enhances students' academic performance and self-study skills.

The study's practical approach reflects real-life teaching situations, providing students with opportunities to apply their knowledge in internships or professional contexts. A survey conducted among PE faculty at HCMUE revealed insights into the design and utilization of DLMs in practical courses. The results, summarized in Table 1, highlight the increasing adoption of DLMs in basketball education and their impact on students' learning outcomes and engagement.

This integration of theoretical and practical perspectives not only meets current educational demands but also contributes to improving students' readiness for their future careers as PE educators.

Table 1. Survey on the Design and Use of DLMs in Online Teaching of Practical Courses by Faculty Members in the Department of Physical Education, Ho Chi Minh City University of Education.

No.	Content	Degree of Agreement (n=20)				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Using DLMs in online teaching combined with face-to-face teaching	3 (15%)	10 (50%)	4 (20%)	3 (15%)	0 (0%)
2	Collecting and using DLMs in online teaching	0 (0%)	2 (10%)	4 (20%)	8 (40%)	6 (30%)
3	Designing DLMs for online teaching of practical courses	5 (25%)	8 (40%)	6 (30%)	1 (5%)	0 (0%)
4	Using DLMs in online teaching to teach motor skills	1 (5%)	4 (20%)	6 (30%)	6 (30%)	3 (15%)
5	Using DLMs in online teaching for physical fitness education	4 (20%)	8 (40%)	6 (30%)	2 (10%)	0 (0%)

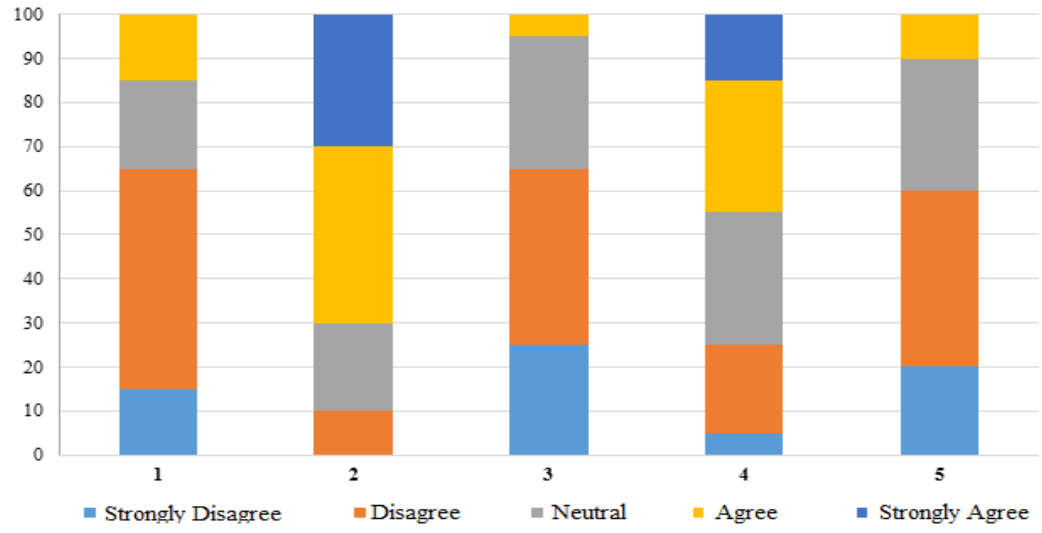

Figure 1. Survey on the Design and Use of DLMs in Online Teaching of Practical Courses by Faculty Members in the Department of Physical Education, Ho Chi Minh City University of Education

Presented in Table 1 and Figure 1: The survey findings indicate that only 5% of instructors design their own DLMs for practical teaching modules, while 40% rely on pre-existing materials. This reflects a potential dependency on readily available resources, which may limit instructors' flexibility in designing teaching activities tailored to students' needs. As a result, achieving the expected learning outcomes aligned with the program objectives may be challenging.

Additionally, the use of DLMs is more commonly applied for teaching motor skills (30%) compared to physical fitness development (10%), demonstrating a cautious approach by instructors toward employing digital tools in PE teaching. Encouragingly, the survey reveals a readiness among instructors to combine face-to-face teaching with online methods—a significant progression compared to one year prior, when such integration seemed unattainable.

In practical teaching contexts, particularly in basketball modules for Physical Education students at HCMUE, DLMs have proven essential. They support students in consolidating technical skills, developing self-study strategies, and improving their ability to convey content effectively. The blended teaching approach has significantly enhanced students' academic performance and autonomy in exploring knowledge.

This necessity extends beyond individual courses to broader professional training programs, emphasizing the urgent demand for a teaching workforce equipped with the necessary competencies to meet the requirements of the 2018 General Education Program in Vietnam.

Application Results

To address these challenges, this study adopts the PDCA (Plan-Do-Check-Act) model to establish a systematic process for designing DLMs. The PDCA cycle, widely recognized in quality management and education, helps avoid repetitive errors and ensures effective planning, implementation, evaluation, and continuous improvement.

The PDCA process includes four key phases:

1. Planning:

- Analyze course objectives, determine resources, and identify suitable DLM formats.

- Develop a detailed roadmap and scenarios to ensure alignment with learning outcomes.

2. Implementation:

- Utilize collected resources to create DLMs while ensuring compatibility between content and format (e.g., videos, infographics).

- Integrate pedagogical methods to explain the implementation process effectively.

3. Evaluation:

- Assess the effectiveness of the designed DLMs to ensure alignment with learning objectives.

- Collect data to make necessary adjustments or improvements, minimizing subjective biases.

4. Improvement:

- Gather feedback to refine DLMs for different learning environments and student needs.

- Restart the cycle as needed, beginning with the planning phase, for continuous enhancement.

Based on this model, the study developed six DLMs for the basketball module, specifically for online teaching in the 47th cohort of Physical Education students. These resources include video tutorials accessible via the following links:

- https://youtu.be/TogEwVT3jxA

- https://youtu.be/0zCNcUR4R4I

- https://youtu.be/sSTbMF6Dkqk

- https://youtu.be/z9pU2R9b-mA

- https://youtu.be/YNuUCePS8Os

- [https://forms.office.com/r/isDwHiAg14.

These materials provide a practical application of the proposed model, supporting students in mastering technical skills and enabling instructors to optimize teaching strategies effectively. The adoption of the PDCA model offers a structured pathway for improving digital integration in practical teaching modules across diverse disciplines.

DISCUSSION

The integration of DLMs into the online teaching of basketball represents a significant shift in physical education pedagogy, aligning with global educational trends emphasizing blended learning approaches (Mayer, 2009). This study provides compelling evidence of the potential benefits and challenges associated with using DLMs in a higher education setting.

The findings indicate that DLMs positively influence students' technical skills, engagement, and self-study abilities. Interactive video tutorials allowed students to visualize movements, identify common mistakes, and practice corrections effectively. This aligns with the research of Zhang and Zhang (2019), who found that video-based materials significantly improve students' comprehension of complex sports techniques. Furthermore, the inclusion of self-assessment tools such as quizzes fostered independent learning and critical thinking, as supported by the work of Alemany-Iturriaga et al. (2024).

The use of the PDCA cycle in designing and implementing DLMs demonstrates a systematic approach to improving instructional quality. By iteratively planning, executing, evaluating, and refining, educators can address content relevance and usability issues. This method aligns with Kenioua and Berkat's (2021) recommendation for structured frameworks in developing digital resources. Additionally, the research highlights the importance of diversifying DLM formats to cater to varied learning styles, including videos for motion-based skills and infographics for theoretical concepts.

Despite the benefits, the study reveals several challenges. Only 5% of surveyed instructors actively design DLMs, indicating limited familiarity or confidence in using digital tools. Koh et al. (2020) emphasize the need for teacher training programs to equip educators with the skills to develop and utilize digital resources effectively. Furthermore, while DLMs significantly enhance individual learning, their integration into group-based activities, such as team coordination drills, remains limited. This echoes the findings of Sopy and Hasibuan (2020), who identified difficulties in adapting digital resources for collaborative tasks in sports education.

The results underscore the necessity of combining traditional and digital teaching methods. As Ahmed et al. (2023) highlight, blended learning approaches not only improve technical proficiency but also prepare students for real-world challenges in the digital era. Future research should explore the long-term impact of DLMs on students' performance and their applicability to other practical courses in physical education. Additionally, the scalability of these resources across institutions with varying technological infrastructure warrants investigation.

CONCLUSION

This study affirms the transformative potential of DLMs in enhancing basketball instruction for physical education students. By addressing both technical and theoretical aspects of the sport, these materials provide a comprehensive learning experience that bridges the gap between traditional pedagogy and modern technological advancements. The findings contribute to the broader discourse on digital innovation in education and offer a roadmap for optimizing teaching strategies in the evolving landscape of physical education.

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