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Sustainable Development of Physical Education in Vietnam: Digital Transformation from 2020 to 2025 and vision to 2030

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Abstract

This study comprehensively analyzes the current state of physical education (PE) in Vietnam during the 2020-2025 period and proposes a strategic development roadmap to 2030. The analysis shows that despite important reforms in policy and curriculum toward developing comprehensive student capabilities, PE work still faces significant challenges. These challenges include the lack and inconsistency of facilities, teachers' capabilities not meeting innovation requirements, and reliance on traditional pedagogical methods. In this context, the report identifies two core drivers for transformation: the national digital transformation strategy in education and the sustainable development orientation. The report argues that strategically integrating digital technologies such as Artificial Intelligence (AI), Big Data, Virtual Reality (VR), and innovative teaching models (Blended Learning, OMO) is not merely a technological solution but an essential means to achieve sustainable development goals, specifically ensuring health and well-being (Sustainable Development Goal 3) and quality, equitable education (Sustainable Development Goal 4). Based on the analysis of the current situation and international trends, the report proposes a comprehensive solution roadmap for the 2025-2030 period, focusing on three main pillars: (1) Curriculum and pedagogical innovation, (2) Capacity development for the teaching staff, and (3) Policy and infrastructure improvement. The ultimate goal is to transform physical education from a traditional subject into a dynamic, data-driven, and inclusive field, contributing to the comprehensive development of Vietnam's younger generation.

Keywords

Physical education, digital transformation, sustainable development, artificial intelligence in education, pedagogical innovation.

1. Introduction

In the context of Vietnam's socio-economic development, the role of physical education (PE) is undergoing a significant transformation and increasingly being recognized for its importance. Going beyond the framework of mere physical training, modern PE is positioned as a pillar in developing well-rounded individuals, including mental health, social well-being, and forming lifelong exercise habits.¹ This shift in perception reflects a global trend where PE is viewed as the foundation for a healthy and dynamic society.

This innovation process is driven by two strategic catalysts from the Government of Vietnam. First is the Vietnam Physical Education and Sports Development Strategy until 2030, with a vision to 2045 (according to Decision No. 1189/QĐ-TTg), which emphasizes the goal of building a sustainable, modern and professional physical education and sports sector.² Second is The project "Strengthening the application of information technology and digital transformation in education and training for the period 2022 - 2025, with orientation toward 2030" (according to Decision No. 131/QĐ-TTg), a major policy aimed at comprehensively modernizing the education sector, in which Physical Education is no exception.⁶

However, a significant gap exists between the ambitious policy vision and implementation practices. The current state of environmental education in Vietnam still faces many limitations, characterized by the lack and inconsistency of facilities and equipment¹⁰; the uneven capacity of the teaching staff, who have not been fully equipped with the necessary skills for the digital era¹¹; and the persistence of traditional, teacher-centered pedagogical methods that fail to promote learner initiative and personalization.¹³ This gap poses a major challenge, requiring a breakthrough and comprehensive approach to realize national goals.

Therefore, this report is conducted with the following specific research objectives:

Systematically analyze and evaluate the current status of physical education in Vietnam during the 2020-2025 period, clearly identifying achievements, limitations, and main barriers.

An in-depth analysis of the potential of digital transformation and sustainable development principles as a lever to address existing challenges and create transformative change in TVET.

Propose a strategic, comprehensive, and evidence-based solution roadmap for the 2025-2030 period, aimed at narrowing the gap between policy and practice, toward a modern, sustainable, and equitable education system.

2. Research method

This study employs a qualitative research method with a descriptive-analytical research design. This approach allows for systematic synthesis, interpretation, and in-depth analysis of diverse data sources to construct a comprehensive and multidimensional picture of the research topic. This approach is particularly suitable for exploring complex, interdisciplinary issues such as the intersection between education policy, technology, and sustainable development.

The data sources of the study consist of a systematic review and analysis of three main groups of documents:

Government policy and regulatory documents: Focusing on strategic decisions that shape the development of Physical Education, including Decision No. 1189/QĐ-TTg on physical education and sports development², Decision No. 131/QĐ-TTg on digital transformation in education and training⁶, along with documents related to the 2018 General Education Program for Physical Education.¹⁴ These documents provide the legal basis and strategic orientation of the state.

Domestic reports and statistics: Data on the current state of school facilities and teacher capacity are compiled from education sector reports and domestic studies.¹⁰ These sources provide actual figures and assessments of the implementation context in Vietnam.

Peer-reviewed international literature: A review of international academic research on the application of digital technology (AI, VR/AR, Blended Learning, Gamification) in education was conducted. The literature sources were selected from reputable scientific journals such as *Frontiers in Public Health*, *Sport, Education and Society*, and *Applied Sciences*. These studies provide theoretical frameworks, empirical evidence, and advanced pedagogical models from around the world.

The report's analytical framework is built upon thematic analysis methodology. This process involves identifying, analyzing, and reporting patterns (themes) within the data. The analysis is structured around three core themes: "Current Status," "Digital Transformation Path," and "Sustainable Development Integration." This analytical framework ensures a rigorous logical flow, moving from problem identification, exploring potential solutions, to proposing a comprehensive strategic roadmap.

3. Results and Discussion

3.1. The Current State of Physical Education in Vietnam (2020-2025)

3.1.1. Policy and Program Framework: Ambitious Goals, Fundamental Shifts

The 2020-2025 period witnessed a fundamental shift in the orientation of Physical Education development in Vietnam, led by a system of visionary policies and teaching programs. Most notably was the 2018 General Education Program for Physical Education, marking a profound philosophical change from the traditional physical training model focused on formulaic exercises to a comprehensive competency development model for learners. The new program emphasizes empowering students with choice, developing overall health (both physical and mental), and equipping essential skills to maintain an active lifestyle throughout life.¹

This vision is strongly reinforced by national strategies. Decision No. 1189/QĐ-TTg sets specific and ambitious goals: by 2030, striving for over 90% of students to meet physical training standards and gradually improving indicators of Vietnamese youth's physical stature to reach a high level in the region.² In parallel,

Decision No. 131/QĐ-TTg on digital transformation in education sets mandatory requirements for technology integration, with the goal that by 2025, 50% of students, pupils, and educators will have sufficient conditions to effectively participate in online teaching and learning activities.⁶ These policies together create a solid legal framework, guiding Vietnam's education to approach international standards.

Table 1: Key objectives in Vietnam's National Strategy for Physical Education and Sports Development (2020-2030)

Category	Target by 2025	Target by 2030	Source
The percentage of students who regularly practice sports	-	Over 45% of the population (including students)	10
Percentage of students meeting physical training standards	-	Above 90%	10
The Stature of Vietnamese Youth	Improve physical fitness indicators and stature	Achieved at a high level in the Asia region	9
Access to online education	50% of students, pupils, and educators are qualified to participate effectively	-	9
Proportion of GDPT content implemented online	Primary school: 5%; Secondary school: 10%	-	9
Developing school sports clubs	Strengthen and vigorously develop various types of clubs	-	10

3.1.2. Resource and capacity status: Gaps in implementation

Although the policy framework has been established clearly and progressively, the implementation practices reveal a significant gap, primarily stemming from limitations in resources and capabilities.

Regarding infrastructure, although there has been increased investment, shortages and lack of synchronization remain major obstacles. According to statistics, the rate of solid classrooms nationwide is high (89.6%), but this does not fully reflect the reality of specialized facilities for Physical Education such as multi-purpose halls, sports grounds, and swimming pools. Investment in these facilities has not been synchronized and there are still many disparities between regions,

especially between urban and rural areas, creating inequality in students' opportunities to access diverse physical activities.¹⁰

Regarding the capacity of the teaching staff, this is a crucial factor but also the biggest weakness. The current physical education teachers have uneven quality. Although professional standards require a college degree in pedagogy or higher and necessary professional skills¹⁸, a significant number of teachers still lack modern pedagogical skills and technological capabilities. Their capacity is often focused on in-depth knowledge of a few specific sports rather than student-centered teaching methods, technology integration, and comprehensive competency development.¹¹ This deficiency makes the implementation of the 2018 Program difficult and ineffective.

The contrast between progressive policy vision and limited resources has created a significant "gap" in the system. The Vietnamese government has established a very clear and modern direction for P.E (Policy). However, the reality at educational institutions shows deficiencies in both physical facilities and the skills of the implementation team (Practice). The crucial missing element here is the bridge—pedagogical models capable of transforming policy vision into effective classroom action. Simply providing more equipment or organizing basic IT training courses is insufficient. The core challenge lies in fundamentally changing teaching behavior. International studies have highlighted advanced pedagogical frameworks such as Blended Learning or the Online-Merge-Offline (OMO) model.¹³ These are the essential tools needed to realize policy objectives. Therefore, the issue lies not merely in the lack of technology, but more profoundly in the deficiency of modern pedagogical methods.

3.2. The Digital Transformation Path in Physical Education

Digital transformation is not just about equipping with technology, but a comprehensive restructuring of teaching and learning methods. In vocational education, this process opens up breakthrough paths to personalize learning, optimize practice time, and enrich student experiences.

3.2.1. Leveraging AI and data to personalize teaching methods

Global trends in physical education are shifting strongly toward data-based models. Artificial intelligence (AI) and computer vision can automate motion analysis and provide immediate, accurate feedback, overcoming the limitations of subjective observation and assessment by teachers.¹³ AI algorithms can create personalized training plans based on individual student data—from physical fitness, skill levels to personal preferences. This aligns perfectly with the "learner-centered" goal of the 2018 Program.¹³ The backbone of these AI systems is data collected from wearable sensors and the Internet of Things (IoT), enabling continuous monitoring of health indicators and activity levels, creating a continuous feedback loop to optimize the learning process.¹³

Table 2: Digital technologies and pedagogical applications in modern online education

Technology	Pedagogical application	Learning objectives
AI & Computer Vision	- Motion analysis and instant feedback - Building personalized training plans	- Improve motor skills - Optimize personal performance
Wearables & IoT	- Health metrics tracking (heart rate, step count) - Exercise intensity monitoring	- Personal Health Management - Forming Exercise Habits
Blended Learning	- Study theory (game rules, tactics) online - Optimize in-class practice time	- Master tactical knowledge - Increase effective practice time
VR & AR	- Simulating complex, safe sports environments - Experience new sports without physical facilities	- Learn skills in a safe environment - Expand sports experience
Gamification & Exergaming	- Integrating game elements into lessons - Using motion video games (exergames)	- Boosting motivation and engagement - Engaging inactive students

3.2.2. Implementation of innovative teaching models

Innovative teaching models, supported by technology, are key to addressing the inherent challenges of traditional education.

Blended Learning and Flipped Classroom: These models help restructure and optimize learning time. Theoretical content such as game rules, tactics, and sports history can be effectively delivered through online platforms before class. This frees up valuable class time to focus entirely on practical activities, physical exercises, and interactions, directly addressing the problem of insufficient time and space in many schools.¹³

The Online-Merge-Offline (OMO) Model: This is an evolution of blended learning, creating a seamless and integrated learning journey. This model includes three stages: online learning before class (Online), in-class practice and deep interaction (Offline), and online consolidation and feedback after class (Merge). Studies have shown that the OMO model significantly enhances student interaction and improves skill acquisition effectiveness in online learning environments.¹³

3.2.3. Potential of Immersive Technology (VR/AR) and Gamification

Virtual reality (VR) and augmented reality (AR) technologies open up new horizons for physical education. They allow for the simulation of complex or high-risk sports environments (such as mountain climbing, skiing) in complete safety.

Furthermore, VR/AR can help students experience sports that schools don't have sufficient facilities to implement, while providing 3D visualizations that help students understand the mechanics of motor skills more deeply.¹³

In addition, Gamification and Exergaming are extremely effective tools for stimulating motivation and interest. By integrating game elements such as scores, leaderboards, and rewards into physical activities, Gamification can make exercise more appealing. Exergaming, with games like dance or virtual tennis, has been proven to strongly attract students who tend to be passive or uninterested in traditional physical activities.¹³

3.3. Integrating Sustainable Development into the Core of Physical Education

Sustainable development in physical education is not just a slogan but a strategic direction that requires the integration of principles of health, fairness, and effectiveness into every aspect of the subject.

3.3.1. Promoting Health and Well-being Throughout Life (Sustainable Development Goal 3)

Modern P.E must be positioned as an indispensable component of the public health system. Its goal is not only limited to helping students achieve physical fitness standards in school, but more importantly, to equip them with knowledge, skills, and attitudes to form lifelong exercise habits and health management.¹⁵ Digital technology plays a crucial role in this. Health tracking applications and smart wearable devices can empower students, enabling them to self-monitor their progress, make data-driven decisions, and extend learning beyond the classroom's space and time, making health care a natural part of daily life.¹³

3.3.2. Ensure Quality, Equitable and Inclusive Education (Sustainable Development Goal 4)

Digital transformation carries great potential to promote equity in education. Standardized digital learning resources and online teaching models can deliver high-quality lessons from top experts to students in remote, rural, or disadvantaged areas, helping to mitigate the negative impact of disparities in teacher quality across regions.²⁰

However, this path also poses a serious risk. Without a clear and decisive national strategy to ensure all students have fair access to devices and internet connectivity, digital transformation could inadvertently exacerbate the digital divide. The gap between well-resourced urban schools and underprivileged rural schools could become increasingly widened, creating a new form of educational inequality.¹⁰ Therefore, a sustainable and equitable digital transformation strategy must be managed and coordinated at the national level, including specific support policies for disadvantaged regions to prevent the creation of a deeper educational divide.

3.3.3. *Building a Sustainable Digital Learning Ecosystem*

The concept of sustainability in physical education needs to be viewed comprehensively, including both economic and environmental aspects. Using VR technology to teach some sports can reduce the need to build large, expensive, and single-purpose facilities. Developing and sharing digital curricula nationwide would be more economically efficient and sustainable than each school developing its own content. This approach not only helps save resources but also aligns with the direction of building a modern, efficient, and responsible education system.²¹

3.4. **Strategic Roadmap: Solutions and Recommendations for the 2025-2030 Period**

To realize the vision of a modern and sustainable physical education, a strategic roadmap with synchronized and feasible solutions is required.

3.4.1. *On Program and Pedagogical Methods: From Theory to Practice*

Recommendation: Build a national digital learning portal for STEM Education. This portal needs to provide standardized, high-quality resources, including technical tutorial videos, detailed lesson plans for blended learning models, and VR/AR modules. All content must be designed in close accordance with the requirements of the 2018 Program. This solution will address the problem of quality resource shortages and provide practical support to teachers in applying new pedagogical methods.⁹

Recommendation: Implement a pilot model of OMO (Online-Merge-Offline) at selected universities and high schools. The goal of the pilot phase is to study, adjust, and build a practical implementation framework that best fits the specific context of Vietnam before scaling up nationwide.

3.4.2. *On Professional Development for Teachers: Building a Team Ready for the Future*

Recommendation: Design and implement a new and mandatory national competency framework for Physical Education teachers. This framework must comprehensively integrate requirements for digital pedagogy, basic data analysis skills, and professional ethics principles in technology use (e.g., protecting student personal data, managing body image issues when using video analysis¹³).

The current standards for teachers¹⁸ are no longer sufficient to meet the demands of the digital era. International studies have shown that the biggest barrier to technology adoption in education is not the technology itself, but rather teachers' lack of skills and resistance to change.¹³ A few isolated training sessions cannot create sustainable change. What is essential is a new, legally binding competency framework to reorient the entire training process at teacher education institutions and subsequent professional development programs. This framework must reposition the role of physical education teachers from mere technical sports instructors to educators who facilitate technology-enhanced learning experiences aimed at the holistic development of students.

Table 3: Proposed Competency Framework for 21st Century Physical Education Teachers in Vietnam

Competency Area	Detailed description
1.Digital Pedagogical Competence	- Design and implement lessons according to Blended Learning, Flipped Classroom, and OMO models. - Proficiently use Learning Management Systems (LMS) and online interaction tools. - Integrate Gamification and Exergaming to enhance student motivation.
2.Technology and Data Capabilities	- Use applications, software, and technology devices (wearables, cameras) to collect movement data. - Analyze and interpret basic physical and performance data to provide personalized feedback. - Evaluate and select technology tools appropriate for lesson objectives.
3.Digital Content Development Capability	- Create and edit simple digital learning materials (videos, interactive lectures). - Search, evaluate, and use open educational resources (OER) effectively and ethically.
4.Digital Ethics and Safety Capabilities	- Understand and comply with regulations on student data protection and privacy. - Guide students on online safety and body image issues in the digital environment. - Ensure fairness and inclusion when using technology, avoiding widening the digital divide.
5. Collaboration and Professional Development Capacity	- Collaborate with technology experts and other teachers to jointly develop teaching solutions. - Proactively learn and continuously update new technology and pedagogical trends.

3.4.3. On Policy and Infrastructure: Creating a Favorable Environment

Recommendation: Implement a targeted investment program to ensure all schools, especially those in rural and disadvantaged areas, are equipped with basic digital infrastructure (stable internet connection, access devices). This is a prerequisite to minimize the digital divide and ensure equity in education.¹⁰

Recommendation: Establish a National Steering Committee on Digital Technical Education. This committee should include experts from the Ministry of Education and Training, the Ministry of Culture, Sports and Tourism, along with representatives from the technology industry. The committee's task is to develop technical standards, ethical guidelines, and a clear roadmap for the sustainable and effective implementation of technology nationwide.

4. Conclusion

This study asserts that Vietnam has established a progressive and comprehensive policy vision for physical education, however, a significant gap still exists between orientation and practice. The current situation is shaped by the parallel existence of an education program that has been reformed in a modern direction and major challenges in resources, facilities, and teacher capacity.

The central argument of the report is that the key to realizing Vietnam's vision for physical education and sports lies in strategically and synergistically implementing two pillars: digital transformation and sustainable development. This is not a choice between technology and objectives, but rather utilizing digital tools as a powerful means to achieve sustainable goals—specifically, lifelong health and well-being, along with quality and equitable education for all.

By 2030, Vietnam's Physical Education can completely transform from a traditional subject into a dynamic, data-based, inclusive educational field and become a solid foundation for national health and welfare. To achieve this, a synchronized and decisive effort at the national level is needed, focusing on pedagogical innovation, empowering and enhancing teacher capacity, along with fair and strategic investment.

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