

# INTERDISCIPLINARY CURRICULUM DESIGN IN PHYSICAL EDUCATION AND ITS IMPLICATIONS FOR EDUCATIONAL MANAGEMENT INNOVATION

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**Abstract:** This paper explores the implementation of interdisciplinary curriculum design in physical education (PE) and its impact on enhancing student engagement, holistic development, and educational management practices. By integrating elements from sciences, arts, and humanities, interdisciplinary PE fosters intellectual, social, and physical growth. Key findings highlight the benefits of collaborative teaching models, flexible assessment frameworks, and student-centered approaches, underscoring the potential for interdisciplinary PE to drive educational innovation.

**Keywords:** Interdisciplinary PE; Student-centered learning

## 1 INTRODUCTION

The integration of interdisciplinary approaches in physical education (PE) addresses the growing emphasis on holistic student development in modern education. Traditional PE, while essential for health and fitness, often lacks connection to broader educational goals. By incorporating elements from sciences, arts, humanities, and technology, interdisciplinary PE enriches student learning, transforming PE into a platform for intellectual, social, and emotional growth alongside physical well-being[1].

## 2 THEORETICAL FOUNDATIONS OF INTERDISCIPLINARY CURRICULUM DESIGN

### 2.1 Models of Integration Between Physical Education and Other Disciplines

Interdisciplinary curriculum design in PE can integrate physical activity with other disciplines to create multifaceted learning. One model merges PE with sciences, such as biology and physics, allowing students to explore human anatomy and biomechanics. Another model links PE with social sciences, like psychology and history, where students examine mental resilience in sports or the historical development of physical activities and their societal impact.

### 2.2 Application of Educational Management Theory in Interdisciplinary Curricula

Implementing interdisciplinary curriculum design in PE requires adaptive educational management to support cross-departmental collaboration, resource-sharing, and teacher development. Traditional management models may limit interdisciplinary efforts, so flexible and collaborative approaches are essential. Effective management practices should provide resources and training for interdisciplinary projects, creating an environment where PE supports not only physical health but also intellectual, social, and creative growth.

## 3 IMPLEMENTATION PATHWAYS FOR INTERDISCIPLINARY CURRICULUM DESIGN IN PHYSICAL EDUCATION

### 3.1 Principles and Methods of Interdisciplinary Curriculum Design

Effective interdisciplinary curriculum design in PE requires clear principles that extend beyond physical fitness to support cognitive, social, and emotional development[2]. Objectives should include fostering critical thinking, teamwork, and problem-solving, bridging physical and intellectual learning. Integrating content from sciences, social studies, and arts with PE in a logical manner, and using diverse methods like collaborative projects and experiential learning, reinforces these interdisciplinary themes, making learning both active and meaningful.

### 3.2 Selection and Design of Interdisciplinary Curriculum Content

Selecting appropriate content is crucial for interdisciplinary PE programs, aligning with students' developmental stages[3]. Younger students might explore basic scientific and social concepts, like muscle function and teamwork, while older students delve into biomechanics, nutrition, sports psychology, and cultural histories of sports.

### 3.3 Practical Activities and Project-Based Learning

Practical, hands-on activities are vital in interdisciplinary PE, as they enable students to apply academic concepts through movement and collaborative projects. Project-based learning fosters active participation and real-world problem-solving, such as designing fitness routines based on physiological principles or creating dance routines that reflect cultural history. Another example includes integrating PE with art, where students study athletic movement and capture it in drawing or photography. Successful implementation of interdisciplinary PE requires adaptable lesson planning, cross-departmental collaboration, and professional development for teachers.



**Figure 1** Integrative Physical Education: A Fusion of Science, Humanities, and Athletic Training

## 4 IMPLICATIONS FOR EDUCATIONAL MANAGEMENT INNOVATION IN PHYSICAL EDUCATION

### 4.1 Encouraging Collaborative Management Models

Interdisciplinary curriculum design requires flexible, collaborative management models that move beyond rigid departmental structures. Integrating PE with subjects like science, arts, and social studies calls for cross-departmental collaboration, with frameworks that support co-planning and cohesive lesson delivery. Management should promote teamwork by setting shared goals, forming interdisciplinary teams, and streamlining communication[4]. This collaborative approach not only strengthens interdisciplinary curricula but also fosters a culture of innovation and unity within the school.

### 4.2 Enhancing Teacher Professional Development and Interdisciplinary Competence

An interdisciplinary approach in PE calls for teachers to possess skills and knowledge beyond their specific subject area, making professional development a critical element in educational management innovation. Traditional PE training may not prepare teachers for integrating concepts from biology, physics, or social studies, so targeted professional development programs are essential. Educational managers can design workshops, seminars, and cross-disciplinary training sessions that equip PE teachers with a foundation in other subjects, enabling them to seamlessly incorporate interdisciplinary content into their lessons.

### 4.3 Strengthening Family-School-Community Partnerships

Interdisciplinary PE curriculum offers a unique opportunity for educational management to strengthen ties with families and community organizations, creating a collaborative ecosystem that supports holistic education. By involving families in interdisciplinary projects, such as community sports events or cultural activity days, schools can foster stronger family-school connections, helping parents become active partners in their children's education. Educational managers can also build partnerships with local sports organizations, cultural centers, and scientific institutions, integrating their expertise and resources into the curriculum.

### 4.4 Redefining Educational Assessment Systems

Traditional PE assessments, focused solely on physical performance, often miss the broader learning outcomes of interdisciplinary curricula. Innovative educational management should create multifaceted assessment frameworks that capture critical thinking, teamwork, and problem-solving skills. For instance, instead of evaluating only fitness levels, assessments can include understanding of scientific principles, collaboration skills, and creative expression. Rubrics that encompass cognitive, social, and physical competencies offer a more complete view of student development.

## **5 Case Studies: Successful Practices of Interdisciplinary Curriculum Design in Physical Education**

### **Case Study 1: Integrating PE with Science and Technology in a U.S. High School**

In a high school in California, the PE department collaborated with science and technology teachers to design a program that merged physical activities with scientific exploration and data analysis. Students participated in fitness activities while simultaneously learning about human anatomy, biomechanics, and data science. For example, students used wearable fitness trackers to monitor their heart rates and physical output during various exercises. They then analyzed the collected data in their science class, examining how different activities impacted cardiovascular health and energy expenditure.

The program's success was attributed to several key factors, including strong interdepartmental collaboration, the use of technology, and an emphasis on hands-on learning. Teachers from PE and science worked closely to align their curricula, ensuring a cohesive learning experience for students. The integration of wearable technology added an engaging, modern element that appealed to students' interests. Additionally, by allowing students to actively engage with scientific data about their own bodies, the program fostered a deeper, more personalized understanding of both PE and science.

### **Case Study 2: Physical Education and Cultural Studies in a Japanese Middle School**

A middle school in Osaka, Japan, implemented a PE program that incorporated cultural studies to explore the traditional sports and physical activities of different cultures. Students learned about sports like sumo wrestling, martial arts, and traditional dances from various countries, examining the historical, social, and cultural significance of each. The curriculum included hands-on practice sessions, where students learned the basic techniques and movements, as well as classroom discussions and projects on the cultural origins and values associated with each activity.

The success of this interdisciplinary program stemmed from its integration of physical activity with cultural education, allowing students to gain global cultural insights while engaging in exercise. Teachers observed increased open-mindedness, respect for diverse practices, and heightened interest in physical activities.

The success of these interdisciplinary PE programs can be attributed to several common factors. First, strong collaboration among teachers across departments is essential for creating a cohesive and integrated learning experience. These case studies also demonstrate the importance of clear and achievable learning objectives that align with both PE and other subjects, ensuring that students gain meaningful insights across disciplines[5].

## **6 CONCLUSIONS**

Interdisciplinary curriculum design in physical education enhances both student learning and educational management by integrating PE with fields such as science, culture, and the arts. This approach fosters critical thinking, creativity, cultural awareness, and personal health, positioning PE as a multidimensional educational experience. Key success factors include strong interdepartmental collaboration, clear objectives, student-centered learning, and support from school leadership.

## **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

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