The Influence of Computer Aided Instruction (CAI) on Students Learning Performance in Physical Education

Tian Zuo[1]*, Jet C. Aquino[2]

[1] *Hainan Vocational University of Science and Technology, China*

[2] *Graduate School, Nueva Ecija University of Science and Technology, Cabanatuan City, Nueva Ecija, Philippines*

Abstract. This study aimed to comprehensively evaluate the influence of Computer-Aided Instruction (CAI) on student learning and performance in college physical education. Analyzing cognitive understanding, knowledge retention, skill development, engagement, and adaptability, the study identified specific components of CAI affecting outcomes. Challenges faced by teachers during CAI integration were explored, and a strategic plan for effective implementation was proposed. The research employed a quantitative descriptive design, focusing on Shijiazhuang Information Engineering Vocational College with 669 student respondents.

It was found that learners and teachers expressed satisfaction with CAI's adaptive learning pathways, interactive simulations, and progress tracking, indicating its value in enhancing the learning experience, CAI in Physical Education was well-received, demonstrating effectiveness in providing an engaging and enriching educational approach, the integration of CAI positively impacted cognitive understanding, memory retention, and bridging theoretical and practical knowledge in physical education, challenges included limited technical proficiency, insufficient training, access to reliable technology, time constraints, and content customization difficulties, learners coped by seeking assistance, independent exploration, using online resources, adapting learning strategies, and engaging in collaborative work and a proposed course of action addressed challenges through targeted workshops, comprehensive training, infrastructure upgrades, flexible scheduling, and adaptive content development.

CAI significantly influences physical education learning, with positive outcomes in engagement, understanding, and performance. Challenges identified underscore the need for tailored interventions. The proposed strategies offer a comprehensive plan for effective CAI utilization, fostering a supportive and technologically equipped learning environment.

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In conclusion, Computer-Aided Instruction (CAI) significantly influences physical education learning, yielding positive outcomes in engagement, understanding, and performance; the identified challenges underscore the imperative for tailored interventions, and the proposed strategies offer a comprehensive plan for effective CAI utilization, fostering a supportive and technologically equipped learning environment; therefore, educational institutions should implement targeted interventions to enhance CAI integration, teaching faculty should adapt teaching strategies and undergo continuous professional development, IT departments should guide infrastructure upgrades and support initiatives for a reliable technological environment, students should actively engage in seeking assistance, independent exploration, and utilizing online resources, and future researchers should build on identified challenges and coping strategies to explore emerging technologies and assess long-term impacts of CAI in educational settings.

1.Introduction

In the ever-evolving landscape of education, technology plays an increasingly vital role in shaping the way knowledge is imparted and acquired. Computer-Aided Instruction (CAI) is a modern educational tool that integrates technology into the learning process, offering interactive and dynamic experiences. This study focuses on evaluating the influence of CAI on student learning and performance within the realm of college physical education. Physical education, an essential component of a well-rounded education, demands innovative approaches to optimize its delivery and enhance student engagement

Traditional physical education instruction often faces challenges in engaging and adapting to the diverse learning styles of students. Integrating CAI into the physical education curriculum can potentially address these challenges by providing an interactive and adaptable learning platform. Understanding how CAI influences student learning and performance is crucial for designing effective and tailored educational experiences. This study aims to delve into the multifaceted impact of CAI, enabling educators to optimize its implementation for the benefit of students and the improvement of educational outcomes.

The research focused on higher educational institutions in Shijiazhuang City, Hebei Province, China, recognizing the importance of integrating technology in education in a region experiencing significant advancements in various sectors. Motivated by the need to enhance the quality of education and meet the demands of a technologically advancing society, this study explored the potential of CAI to bridge gaps in the current pedagogical approach in higher education, specifically in physical education.

This study addressed several gaps in the existing body of knowledge. First, while there is a growing body of research on technology integration in education, a comprehensive evaluation of CAI's impact on physical education, particularly in higher education contexts, is relatively underrepresented. The study aimed to bridge this gap by focusing on the unique dynamics of college-level physical education. Second, the study aimed to provide an understanding of the challenges teachers encounter when integrating CAI into the physical education curriculum. Understanding these challenges is crucial for developing strategies to overcome them, ultimately enhancing the effectiveness of CAI.

Third, the study aimed to identify the specific components and features of CAI that significantly affect student learning and performance. Through pinpointing these components, educators can strategically design and tailor CAI modules to optimize learning outcomes.

This study drew on a foundation of existing researches that emphasize the potential of technology integration in education. Works by Timotheus et al. (2023) emphasize the transformative impact of technology in educational settings. Additionally, studies by Dap-og & Orongan (2021) provide valuable insights into the role of CAI in enhancing student engagement and performance. These research findings substantiated the need for a focused study on the influence of CAI in the specific domain of college physical education.The motivation behind this study lies in the evolving educational landscape where technology, particularly Computer-Aided Instruction (CAI), is increasingly integral to the learning process. With a focus on college physical education, this research aimed to evaluate the impact of CAI on student learning and performance. Traditional physical education often struggles to engage diverse learning styles, and integrating CAI offers an interactive and adaptable solution.

This study sought to uncover the multifaceted influence of CAI, addressing gaps in current knowledge, and providing insights into technology's integration into higher education in Shijiazhuang, China, where educational quality and technological advancement intersect. By exploring CAI's unique impact on physical education at the college level, identifying teacher challenges, and pinpointing influential CAI components, this research built on existing studies highlighting technology's transformative role in education, emphasizing the need for a dedicated examination in the context of college physical education.

2.Methodology

The research design adopted for this study is the quantitative descriptive research design. This approach involves the systematic collection, analysis, and interpretation of numerical data to describe, summarize, and analyze the phenomena of interest in a precise and structured manner (Creswell & Creswell, 2017). In this design, researchers gather data that represent a wide array of variables within the study's scope, and the findings are presented in the form of statistics, tables, or graphs to offer a clear overview of the observed patterns and trends.

The quantitative descriptive research design is particularly suitable for this study due to several justifications. Firstly, this design aligns with the study's aim to evaluate the influence of integrating Computer-Aided Instruction (CAI) in college physical education. Through the utilization of structured questionnaires, surveys, or assessments, a large amount of data can be systematically collected from a significant sample of participants. The quantitative approach allows for a standardized measurement of key variables such as cognitive understanding, knowledge retention, skill development, engagement, and performance.

2.1. Data Gathering Procedure

The data-gathering procedure for this study, employing a quantitative descriptive research design, involved a structured approach to collect data from the targeted participants.

2.2. Respondents

In this study, the primary respondents consisted of teachers currently employed in higher vocational colleges and universities. To ensure the selection of suitable participants, specific criteria for teacher inclusion have been established. The study was designed to include teachers from higher vocational colleges in the regions of Beijing, Shanghai, Guangdong, Jiangsu, and Zhejiang to ensure a diversity of opinions and experiences. College students who had received information technology teaching were also included. The specific study sample comprised sophomore students majoring in economics and trade from a higher vocational college in Guangdong Province.

2.2.1 Distribution of Respondents

The respondents of the study were primarily students enrolled in various programs at Shijiazhuang Information Engineering Vocational College. These students represented the target population for the research, and their perspectives and experiences with Computer-Aided Instruction (CAI) in the context of physical education were central to the study.

Specifically, the respondents include students from the College's physical education programs, technology-related programs (aligned with the information engineering focus), and any other programs that may have exposure to CAI as part of their curriculum. The inclusion of students from different academic backgrounds provided a comprehensive understanding of how CAI is perceived and utilized across various educational domains within the college.

Table 1 *Distribution of Respondents*

	Number of Sample	Sample Size (Raosoft)
Teacher	1,200	292
Students	20,000	377
Total	**21,200**	**669**

3. Results and Discussion

The key findings from the learners' descriptions of Computer-Aided Instruction Across various dimensions, both teachers and students expressed a generally positive outlook, with mean scores indicating satisfaction with the CAI experience. The integration of CAI in physical education is perceived to have a moderate to high positive influence on cognitive understanding, memory retention, and the ability to connect theoretical concepts with practical examples, as reported by both teachers and students. Students' top-ranked challenges in CAI utilization revolve around technical proficiency, training and guidance, access to reliable technology, time constraints, and content customization. These findings emphasize the multifaceted nature of challenges in integrating CAI into the learning environment, pointing towards the need for comprehensive strategies to address both technological and instructional aspects.

Conclusions

Learners and teachers both expressed satisfaction with various aspects of Computer-Aided Instruction (CAI), including its adaptive learning pathways, interactive simulations, immediate feedback, and progress-tracking capabilities. CAI is a valuable tool for enhancing the learning experience in physical education. By implementing the proposed strategies, educational institutions can foster a more supportive and technologically equipped environment that maximizes the benefits of CAI and promotes successful learning outcomes.

Acknowledgements

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