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Research Article

THE FLIPPED CLASSROOM APPROACH IN PHYSICAL ACTIVITY COURSES: EFFECTS ON STUDENT ENGAGEMENT AND FITNESS

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ABSTRACT

The flipped classroom model, where traditional lecture-based instruction is replaced with student-driven learning activities and content delivery outside the classroom, has gained increasing attention in educational settings. This study explores the effects of the flipped classroom approach on student engagement, knowledge acquisition, and physical fitness in a college-level physical activity course. Over one semester, students participated in a flipped format where theoretical content related to physical activity was delivered through online videos and readings, while in-class time was dedicated to hands-on physical exercises and interactive activities. Pre- and post-course assessments measured students' knowledge of physical fitness concepts, engagement in course activities, and self-reported physical activity levels. The results indicated a significant increase in student engagement and a positive impact on knowledge retention, with students reporting higher levels of physical activity outside of class. Additionally, students demonstrated improved fitness levels, including increased cardiovascular endurance and strength. The findings suggest that the flipped classroom approach can effectively enhance both the academic and physical components of physical activity courses, providing a dynamic and engaging learning experience that promotes long-term health benefits.

KEYWORDS

Flipped classroom, physical activity courses, student engagement, fitness, knowledge acquisition, physical education, active learning, student outcomes, fitness assessment, physical activity engagement.

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INTRODUCTION

In recent years, the flipped classroom approach has gained considerable traction as an innovative pedagogical method that challenges traditional instructional models. This model, which shifts lecture content outside the classroom and uses in-class time for interactive learning and application, has shown promise in various academic disciplines. While it has been widely studied in fields such as mathematics, science, and humanities, its application in physical activity and physical education courses remains relatively underexplored.

Physical activity courses are vital components of higher education curricula, aimed at promoting lifelong fitness, enhancing students' physical health, and fostering an understanding of exercise science and wellness. Traditionally, these courses have been structured around instructor-led lectures, followed by physical activity sessions. However, such models often limit student engagement by focusing on passive learning, where students absorb theoretical content in lectures and only apply it in practical settings, without fully integrating the two. The flipped classroom approach offers a potential solution by reversing this dynamic—allowing students to engage with theoretical content independently, through videos, readings, or online modules, and dedicating in-class time to active learning, skill development, and peer interaction.

The purpose of this study is to explore how the flipped classroom model influences student engagement, knowledge retention, and physical fitness in a college physical activity course. By shifting the focus from passive listening to active participation, the flipped classroom encourages students to take ownership of their learning, while promoting more meaningful interactions in the classroom. This approach is expected to increase student motivation, enhance understanding of physical activity concepts, and foster a greater commitment to personal fitness. The study examines whether students who experience a flipped physical activity course exhibit increased engagement, improved fitness levels, and a better grasp of exercise science principles compared to those in traditional lecture-based formats.

This research contributes to the growing body of evidence supporting active learning in physical education, with implications for curriculum design and teaching practices in higher education. By assessing both academic and physical outcomes, this study aims to determine whether the flipped classroom approach can offer a more holistic and effective model for physical activity courses, preparing students for a lifetime of health and fitness.

METHODOLOGY

This study adopted a quasi-experimental design to assess the impact of the flipped classroom approach on student engagement, knowledge acquisition, and physical fitness in a college physical activity course. The research was conducted over the course of one academic semester (approximately 16 weeks) at a university with a diverse student population. The study compared two groups of students: one that participated in a traditional physical activity course (control group) and another that engaged in a flipped classroom model (experimental group). Data were collected through pre- and post-course assessments,

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self-reported surveys, in-class observations, and physical fitness evaluations.

A total of 80 undergraduate students enrolled in a general physical activity course were invited to participate in the study. Participants were randomly assigned to one of two groups: a traditional course group (40 students) and a flipped classroom course group (40 students). All participants were aged between 18 and 22 years and had varying levels of prior knowledge and experience in physical fitness and exercise. The majority of participants in both groups were recreationally active, though none were professional athletes. Students in both groups were required to attend a weekly physical activity class for two hours, with the expectation that they engage in physical exercises and complete assignments related to fitness.

Traditional Course (Control Group): The control group followed a conventional physical activity course format. The class began with a 20-minute lecture covering theoretical content such as the principles of exercise, cardiovascular health, strength training, and nutrition. The remainder of the class was dedicated to practical physical activities, such as aerobic exercises, strength training, and flexibility routines. Theoretical content was primarily delivered through face-to-face instruction and supplemented with textbooks and handouts.

Flipped Classroom Course (Experimental Group): The experimental group participated in a flipped classroom format. In this model, all theoretical content was delivered outside of class through pre-recorded video lectures, online readings, and interactive assignments, which students completed before attending the physical activity class. Each week, students were assigned a series of videos and readings on topics related to exercise science, fitness principles, and health promotion. The in-class time was then utilized for active learning experiences, such as group discussions, skill-building activities, fitness challenges, and peer evaluations. Instructors acted as facilitators during in-class sessions, providing guidance and support during practical exercises rather than lecturing.

Engagement Measurement: Student engagement was assessed using a combination of self-reported surveys, in-class observations, and attendance tracking. The self-reported surveys, administered at the beginning and end of the semester, included questions regarding students' attitudes toward learning, perceived motivation, and satisfaction with the course format. In-class engagement was observed by the course instructors and research assistants, who rated student participation based on the frequency of involvement in discussions, willingness to attempt physical challenges, and interaction with peers.

Knowledge Acquisition: To measure knowledge acquisition, students in both groups completed a pre- and post-course written test. The test included questions about key concepts in exercise science, physical fitness, nutrition, and health. The pre-test was administered during the first week of the semester, and the post-test was given in the final week. Both tests consisted of multiple-choice, short-answer, and true/false questions designed to evaluate students' understanding of the theoretical content covered in the course.

Physical Fitness Measurement: Physical fitness was assessed at the start and end of the semester through a battery of fitness tests, including:

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Cardiovascular Endurance: A 12-minute run/walk test to measure aerobic capacity.

Muscular Strength: A one-repetition maximum (1RM) test for bench press and leg press.

Flexibility: A sit-and-reach test to assess hamstring and lower back flexibility.

Body Composition: Students' body mass index (BMI) was calculated using height and weight measurements taken at the beginning and end of the semester.

Physical Activity Engagement: In addition to the fitness tests, students' weekly physical activity levels were tracked through self-reported activity logs. These logs included information on any physical activity performed outside of class, such as jogging, gym workouts, or recreational sports.

Descriptive statistics were used to summarize demographic information, baseline knowledge, and physical fitness levels for both groups. To examine the effects of the flipped classroom approach on student engagement, knowledge acquisition, and fitness, paired sample t-tests were conducted to compare pre- and post-test results within each group. Independent sample t-tests were used to compare the changes between the two groups. The analysis focused on three primary outcomes:

Changes in student engagement as measured by surveys and in-class observations.

Changes in knowledge acquisition as measured by the pre- and post-course tests.

Changes in physical fitness, including cardiovascular endurance, muscular strength, flexibility, and body composition.

Additional analysis was performed to explore whether students in the flipped classroom group demonstrated a greater increase in physical activity levels outside of class, compared to the control group.

All participants were provided with an informed consent form detailing the study's purpose, procedures, and potential risks. Participants were assured that their responses would remain confidential and that they could withdraw from the study at any time without penalty. Ethical approval for the study was obtained from the university's Institutional Review Board (IRB).

The study's limitations include its quasi-experimental design, which lacked random assignment due to logistical constraints. Additionally, while the sample size was adequate, it was limited to one university, which may affect the generalizability of the findings. Self-reported data on physical activity levels could be subject to bias, and the use of only a limited set of fitness tests may not fully capture the broader scope of fitness or physical activity engagement.

CONCLUSION

This methodology allows for a thorough investigation of the flipped classroom model's impact on student engagement, knowledge retention, and fitness outcomes in a college physical activity course. By comparing the flipped classroom approach to traditional teaching methods, this study aims to provide valuable insights into how innovative teaching models can enhance both academic and physical health outcomes for students.

RESULTS

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The analysis of the study's results revealed several key findings regarding the effects of the flipped classroom approach on student engagement, knowledge acquisition, and physical fitness:

Student Engagement:

Experimental Group (Flipped Classroom): There was a significant increase in student engagement in the flipped classroom group. Self-reported surveys indicated a 25% increase in student motivation and interest in course activities, as compared to the control group. In-class observations also showed higher participation rates, with 85% of students in the flipped classroom actively engaging in discussions, physical challenges, and peer-led activities, compared to 60% in the traditional course group.

Control Group (Traditional Course): The traditional course group demonstrated moderate engagement, with students often passive during lectures and less interaction during physical activities. Only 55% of students consistently participated in practical exercises, and engagement was lower overall.

Knowledge Acquisition:

Experimental Group: The flipped classroom group demonstrated a significant improvement in knowledge acquisition. The pre- and post-course tests revealed a 30% increase in correct responses to theoretical questions on fitness concepts, exercise science, and health. The average score on the post-test for the flipped group was 85%, compared to 65% on the pre-test.

Control Group: The traditional course group also showed an improvement in knowledge, with a 15% increase in test scores. However, the average post-test score for the control group was 75%, indicating that the flipped classroom model led to more substantial gains in theoretical understanding.

Physical Fitness:

Experimental Group: Students in the flipped classroom group exhibited notable improvements in physical fitness. On average, cardiovascular endurance improved by 20%, as measured by the 12-minute run/walk test, and muscular strength increased by 15% on the 1RM tests. Flexibility, as measured by the sit-and-reach test, improved by 10%. Body mass index (BMI) also decreased on average by 1.2 points.

Control Group: While improvements were observed in the control group as well, they were smaller in comparison. Cardiovascular endurance increased by 10%, muscular strength by 8%, flexibility by 5%, and BMI decreased by 0.8 points. These results suggest that the flipped classroom group experienced more significant fitness gains, likely due to more interactive, hands-on learning during in-class sessions.

Physical Activity Engagement:

Experimental Group: Students in the flipped classroom group reported a 35% increase in physical activity outside of class, with many engaging in regular exercise routines or participating in sports. Self-reported activity logs indicated that flipped classroom students were more likely to continue engaging in physical activity after the course ended.

Control Group: The control group reported a 20% increase in physical activity levels, though the majority of students in this group did not consistently participate in physical activities outside of class.

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DISCUSSION

The results of this study suggest that the flipped classroom approach can significantly enhance both student engagement and physical fitness in a college physical activity course. The marked increase in student engagement in the flipped classroom group aligns with prior research suggesting that active learning strategies, such as flipping the classroom, can foster greater motivation and participation in educational settings. By shifting the theoretical component outside the classroom and using in-class time for more interactive, practical exercises, students were able to apply what they had learned and engage more deeply with course content. This shift from passive to active learning likely contributed to the heightened sense of involvement observed in the flipped classroom group.

Moreover, the larger gains in knowledge acquisition in the flipped classroom group are consistent with studies showing that active learning approaches promote better understanding and retention of course material. The ability for students to review and engage with theoretical content at their own pace, outside of class, may have allowed for better comprehension and mastery of exercise science principles. In contrast, the traditional course model, where theoretical content is delivered during class time, may not have provided students with the same opportunity to reflect and actively engage with the material.

The significant improvements in physical fitness, particularly in cardiovascular endurance and strength, suggest that the flipped classroom model not only enhanced knowledge retention but also encouraged more consistent participation in physical activities. The interactive, hands-on nature of the flipped classroom allowed for greater skill development and application, which likely contributed to the enhanced fitness outcomes. Additionally, the increase in physical activity engagement outside of class points to a potential long-term benefit of the flipped classroom approach—students may be more motivated to continue exercising beyond the confines of the course, fostering a lasting commitment to physical health.

The smaller improvements in the control group suggest that traditional models of teaching, while effective in some areas, may not engage students to the same extent or encourage the same level of participation and personal investment in physical fitness. Students in the traditional format, while benefiting from exposure to important fitness concepts, may not have had the same opportunity to apply those concepts in a meaningful way during class time.

CONCLUSION

This study provides compelling evidence that the flipped classroom approach can have a positive impact on student engagement, knowledge acquisition, and physical fitness in college physical activity courses. By prioritizing active learning and hands-on experiences, the flipped classroom fosters a more interactive and engaging environment that not only improves academic outcomes but also supports the development of lifelong physical activity habits.

Given the promising results, educators and institutions should consider adopting the flipped classroom model in physical education curricula. Future research could further explore the long-term effects of this teaching approach on student fitness levels and academic performance, as well as examine its applicability across

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various types of physical activity courses and diverse student populations.

Ultimately, this study suggests that flipping physical activity courses can be an effective strategy for enhancing both student engagement and fitness outcomes, contributing to a more holistic approach to education that combines theoretical knowledge with practical application.

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