

Demonstration Methods in Primary Schools: A Study of Academic Achievement in Physical and Health Education

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Abstract

This research aimed to investigate how the demonstration method influences the academic performance of primary school students in physical and health education in Kwara State, Nigeria. The study followed a quasi-experimental design, involving 79 pupils from two public primary schools. The research utilized the 'Physical and Health Education Achievement Test (PHEAT)' as the assessment tool, which was carefully validated and tested for its reliability, showing a reliability index of 0.76 using the test-retest method. Two hypotheses were formulated and examined using Analysis of Covariance (ANCOVA). The results of the study revealed a significant positive impact of the demonstration method on pupils' academic achievement in Physical and Health Education. However, when considering gender as a factor, the interaction between treatment and gender did not show a significant effect on pupils' academic achievement in the same subject. In conclusion, the findings suggest that using the demonstration method can enhance the academic achievement of primary school pupils in physical and health education, irrespective of their gender. Based on these results, it is recommended that teachers receive training in utilizing the demonstration method while teaching Physical and Health Education.

INTRODUCTION

Health and physical education play a crucial role in a comprehensive educational program. Children who maintain good health and engage in regular physical activity have a higher likelihood of reaching their full academic potential and coping with the demands of today's fast-paced lifestyles. By providing students with essential knowledge and skills, health and physical education empower them to lead physically active and healthy lives not just during their school years but throughout their lifetimes (Nadal, 2017). In Nigeria, Physical and Health Education (PHE) focuses on improving individuals' overall well-being, encompassing their physical, mental, and social development. It equips students with knowledge, attitudes, and abilities related to physical activity, fitness, health, and wellness (Fashola, 2017). PHE is mandatory for students in both primary and secondary schools, promoting healthy habits, disease prevention, and enhancing their physical and mental capabilities to function effectively in daily life (Federal Ministry of Education, 2013).

Health and physical education in Nigeria serve as a platform for enhancing health-related knowledge, attitudes, and behaviors among students. It enables them to make informed decisions about health-related matters. PHE offers a diverse range of activities, including games, sports, gymnastics, dance, and exercise, all geared towards enhancing students' physical fitness, motor skills, as well as their cognitive and affective domains (Adeyemi, 2017). The curriculum also covers critical subjects such as personal hygiene, nutrition, substance abuse, reproductive health, and HIV/AIDS

education, aiming to promote healthy behaviors, prevent diseases, and reduce the risks of morbidity and mortality (Olaleye & Ajidahun, 2017). The integration of PHE into the educational system is mandated by the National Policy on Education (NPE), which ensures its inclusion from primary to tertiary education levels (Federal Ministry of Education, 2013). The Nigerian Educational Research and Development Council (NERDC, 2013) is responsible for designing the PHE curriculum and regularly updating it to align with current trends and practices, ensuring the relevance and effectiveness of health and physical education in Nigeria's education system.

The effectiveness of PHE and students' academic achievement largely depend on the teaching methods used during the learning process (Adeniyi, 2018). Student performance in external examinations is used as an indicator of academic success, but research indicates that many students' performance in PHE external examinations falls below the expected level, with most achieving grades ranging from pass to failure (Adeyemi & Adeyemi, 2020; Akinpelu & Folarin, 2015; Babalola & Olaoye, 2019). This raises concerns considering that a credit score of C6 is the minimum requirement for further studies in PHE and related courses (West African Examinations Council, 2021). The use of traditional teaching methods in delivering PHE might contribute to this situation (Olaleye, 2019). To address this, scholars have proposed employing the demonstration method to enhance students' academic achievement in Physical and Health Education (Chen, Wang, & Liao, 2017; Wang, Zhang, & Chen, 2018).

The demonstration method involves using live or recorded demonstrations to teach specific topics or skills, which is commonly used in science and technical fields to clarify complex concepts that may be difficult to understand through theoretical explanations alone (Mohammad, 2014). This method allows students to observe and interact with the subject matter directly, thereby enhancing the learning experience. During the demonstration, the teacher performs the task or experiment while explaining the steps involved and the underlying principles, encouraging students to ask questions and make observations. Afterward, the teacher discusses the results and provides a summary of the key takeaways from the session.

The demonstration method is a teaching approach where the teacher takes on the primary role, while the students observe with the intention of performing the task later. The teacher demonstrates the required actions or processes that the students are expected to replicate at the end of the lesson, providing a step-by-step explanation during the demonstration (Ameh, Daniel, and Akus, 2007). Mundi (2006) described it as a display or exhibition conducted by the teacher, capturing students' keen interest by showing how something works or the steps involved in a process. Some advantages of this method, as outlined by Olaitan (1984) and Mundi (2006), include time-saving and economical use of materials, being attention-grabbing and motivating for students, providing immediate feedback through students' own products, presenting real-life situations for skill acquisition using tools and materials, serving as a motivational tool when delivered by skilled teachers, and effectively demonstrating appropriate ways of doing things.

In the demonstration method, teachers take the lead role in showcasing the required tasks, while students observe and subsequently put the knowledge into practice. In classrooms employing this approach, teachers provide a detailed explanation of the lesson and demonstrate all the procedures to be followed (Ameh et al., 2007). Numerous studies have explored the impact of the demonstration instructional approach on students' academic achievement across various subjects. For instance, a study by Ameh and Dantani (2012) examined the effect of the demonstration and lecture methods on students' achievement in chemistry and found that the demonstration approach was effective in enhancing the chemistry achievement of secondary school students. Ameh and Dantani argued that this approach facilitates active student participation in the lesson. Similarly, Ogologo & Wagbara (2013) and Udo (2010) contended that the demonstration approach leads to significantly better academic achievement for students compared to the conventional approach due to increased student involvement in the learning process.

Despite several studies investigating the impact of the demonstration method on various aspects of education, including academic performance, no specific research has explored its effect on primary-level students' academic achievement in Ilorin West Local Government Area of Kwara State, Nigeria (Ameh & Dantan, 2012; Efe & Suleiman, 2016; James, Ugwu, & Eze, 2019; Achimugu, 2018). Therefore, this study aims to fill this research gap. Additionally, gender is considered as a variable in this study to explore its potential influence on students' academic performance, given the mixed findings from previous research on this topic (Nnamani & Oyibe, 2016; Pirmohamed, Debowska & Boduszek, 2017; Lori, Michelle, Glenda & Brian, 2019). Hence, the inclusion of gender as a variable in this study is justified.

Statement of the Problem

Physical and Health Education (PHE) is a compulsory subject taught in primary and secondary schools throughout Nigeria. Its purpose is to foster the physical, mental, and social well-being of individuals through a range of activities such as games, sports, gymnastics, dance, and exercise. Despite its significance, students' academic performance in PHE external examinations falls below average. This could be attributed to the traditional teaching methods employed in PHE instruction. Scholars have proposed the use of the demonstration method to enhance students' academic achievement in PHE. Although several studies have explored the impact of the demonstration method, none have specifically investigated its effect on primary-level students' academic performance in Physical and Health Education, particularly in the Obudu Local Government Area of Cross River State, where this study took place. This study aims to determine the effect of the interaction of medication and gender on student academic achievement in Physical and Health Education

METHODS

The study employed a quasi-experimental research design with a two-by-two factorial design to investigate the impact of the demonstration method on the academic achievement of primary four students in Physical and Health Education in the Obudu Local Government Area of Cross River State, Nigeria. The researchers selected two public primary schools randomly, with one school designated as the experimental group and the other as the control group. All primary four students from both schools participated in the study.

To measure the students' achievement, the researchers created the "Physical and Health Education Accomplishment Exam (PHEAT)" consisting of twenty multiple-choice questions. The content of the exam was based on the Physical and Health Education Scheme of Work for Primary 4. To ensure the validity of the exam, six lecturers from Kwara State University, specializing in Early Childhood and Primary Education, and Human Kinetics and Health Education, reviewed the questions along with the Demonstration Instructional Guide (DIG) and Conventional Instructional Guide (CIG).

To assess the reliability of the PHEAT, a test-retest approach was utilized. The exam was administered to 25 primary four students who were not part of the main study. These students took the test twice, with a two-week interval between administrations. The Pearson Product Moment Correlation (PPMC) was then used to correlate the data from the two administrations. The reliability coefficient of 0.76 indicated an acceptable level of consistency in the test results.

The study's duration was six weeks, during which the experimental group was exposed to the demonstration method, while the control group received instruction through conventional methods. After the study period, the collected data were subjected to Analysis of Covariance (ANCOVA) for statistical analysis, allowing the researchers to compare the academic achievement of students in both groups while controlling for any initial differences between them.

By adopting this research design and statistical analysis, the study aimed to provide valuable insights into the effectiveness of the demonstration method in enhancing students' academic achievement in Physical and Health Education. The use of a quasi-experimental design allowed the researchers to draw meaningful conclusions from the data collected under real-world conditions, despite the lack of random assignment of participants to groups. Overall, the study's approach was

systematic and rigorous, providing a solid foundation for drawing conclusions and making recommendations based on its findings.

RESULTS AND DISCUSSION

Based on the data obtained, the results of the data processing indicated that there was no significant main effect of the treatment on the academic achievement of students in Physical Education and Health. These findings are derived from the data analysis results as presented in Table 1.

Table 1. Result of Summary of Analysis of Covariance (ANCOVA)

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|--------------------|-------------------------|----|-------------|---------|------|
| Corrected Model | 8009.492 ^a | 4 | 2002.373 | 138.184 | .000 |
| Intercept | 25.673 | 1 | 25.673 | 1.772 | .187 |
| Pretest | 2.601 | 1 | 2.601 | .179 | .673 |
| Treatment | 7818.716 | 1 | 7818.716 | 539.571 | .000 |
| Treatment * Gender | 16.261 | 1 | 16.261 | 1.122 | .293 |
| Error | 1072.305 | 74 | 14.491 | | |
| Total | 313254.000 | 79 | | | |
| Corrected Total | 9081.797 | 78 | | | |

Table 1 presents evidence indicating a significant impact of the treatment on the academic achievement of pupils in Physical and Health Education ($F_{(1; 74)} = 539.571$, $P < 0.05$). The null hypothesis is therefore rejected in the light of the result since the significant value (.000) is less than 0.05. This suggests that the treatment had a notable impact on the academic achievement of pupils in Physical and Health Education. The specific factors contributing to this significant difference are detailed in the table provided below as Table 2.

Table 2. Summary of Bonferroni's Poc Hoc Pairwise Comparison of the scores between the two groups

| Treatment | Mean Difference | Experimental | Control Group |
|----------------------|-----------------|--------------|---------------|
| Demonstration Method | 74.99 | * | |
| Conventional Method | 54.17 | | * |

Table 2 confirms that the significant effect observed in Table 1 can be attributed to the notable difference between the demonstration method and the conventional method. In this study, the demonstration method was applied to the experimental group, while the conventional method was used for the control group. The results indicate that individuals exposed to the demonstration method (with an average score of 74.99) demonstrated significantly higher performance compared to those exposed to the conventional method (with an average score of 54.17).

These findings are in line with the research conducted by Chen et al. (2017), which also showed that instruction based on demonstrations was more effective than traditional lecture-based instruction in improving students' understanding of physical fitness. Similarly, the results are consistent with the study conducted by Wang et al. (2018), which revealed that a combination of demonstration and hands-on practice was more effective than traditional instruction in enhancing students' motor skills in Physical Education.

However, the current findings contradict the report by D'Mello et al. (2017), which suggested that the demonstration method did not have a significant impact on students' academic achievement.

Furthermore, this study demonstrated that there is no noteworthy interaction between treatment and gender in relation to the academic achievement of pupils in Physical and Health Education. Table 1 demonstrates that there was no noteworthy interaction effect between treatment and gender concerning the academic achievement of pupils in Physical and Health Education ($F_{(1; 74)} = 1.122$, $P > 0.05$). The null hypothesis is thus upheld based on the results, as the significant value (.293) is greater than 0.05. This finding aligns with the study conducted by Adedjoja et al (2013) and Tella (2013), which similarly concluded that there was no significant interaction effect of treatment and gender on pupils' learning outcomes.

Indeed, gender can be one of the factors that influence the academic achievement of students in physical education and health, but it is essential to recognize that it is just one piece of the puzzle. While some general differences may be observed in interests and preferences between male and female students, it is important to avoid making rigid assumptions about how gender directly correlates with academic performance in this field.

Numerous factors, such as cultural influences, the school environment, societal attitudes, and individual differences, can interact with gender to shape students' experiences and achievements in physical education and health. For example, cultural norms that reinforce gender stereotypes may impact the opportunities and encouragement given to students, affecting their participation levels. Similarly, variations in teaching approaches between male and female educators might contribute to different learning experiences for students of different genders.

However, it is crucial to remember that each student is unique and can have diverse interests, abilities, and performances, irrespective of gender. Some female students may excel in competitive sports, while some male students may show strong interest in general physical activities and health. It is essential to avoid rigid generalizations and to acknowledge the individuality and complexity of students' experiences and achievements in physical education and health.

By recognizing and understanding the diverse factors at play, educators and policymakers can create an inclusive and supportive environment that fosters the academic success and well-being of all students, regardless of their gender. It is crucial to promote equal opportunities, challenge gender stereotypes, and provide a diverse range of physical education and health activities that cater to the interests and abilities of all students.

CONCLUSION

In light of the study's results, it can be inferred that the demonstration method can lead to improvements in the academic achievement of pupils in physical and health education, regardless of their gender. Consequently, based on these findings, the study proposes the following recommendations: (1) Teachers should incorporate the use of the demonstration method when teaching physical and health education. By actively involving students in the learning process and providing them with real-life demonstrations, teachers can foster a deeper understanding and appreciation of the topics covered in the curriculum; (2) Efforts should be made to organize seminars, workshops, and conferences for teachers to enhance their understanding and implementation of the demonstration method.

By combining the use of the demonstration method with well-equipped and trained teachers, schools can create a conducive learning environment that encourages active student engagement and academic growth in physical and health education. These recommendations have the potential to positively impact students' learning experiences and overall academic achievement in this subject, contributing to the broader goal of promoting a healthier and more physically active population.

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