



Effect of Preparatory Homework on Pupils' Academic Performance in Basic Science

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ABSTRACT

This study examined the effect of preparatory homework on pupils' academic performance in Basic Science in Ilorin West Local Government Area, Kwara State. Preparatory homework is considered an instructional strategy intended to enhance learning outcomes by introducing concepts before classroom instruction. The purpose of this study was to determine whether such homework contributes to academic improvement. A quasi-experimental pre-test, post-test, and control group design was adopted. Four schools were selected through simple random sampling, and the instruments used included the Basic Science Achievement Test (BSAT) and a Preparatory Homework Guide (PHP). Data were analyzed using ANCOVA. The findings revealed no significant effect of preparatory homework on pupils' academic performance because the treatment group did not outperform the control group. Similarly, no significant effect of gender or interaction between gender and preparatory homework was found. These results suggest that instructional strategies should be tailored more holistically to address diverse learner needs in Basic Science.

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1. INTRODUCTION

Education is the cornerstone of societal progress, and the academic performance of students is a crucial measure of educational effectiveness. In recent years, there has been increasing emphasis on identifying effective strategies to enhance students' academic achievement. One such strategy is the use of preparatory homework, which involves assigning tasks to be completed before a lesson to provide students with a preview of upcoming material. Preparatory homework has gained recognition as a potentially impactful instructional tool because it promotes active engagement with the subject matter and reinforces learning. By completing homework assignments, students have the opportunity to review and consolidate their understanding of concepts, develop problem-solving skills, and establish connections between prior knowledge and new content.

Preparatory homework refers to assignments or tasks that are given to students to complete before a scheduled lesson or instructional session. It aims to prepare students for upcoming content, introduce new concepts, or review previously covered material. Preparatory homework can take various forms, including reading assignments, problem-solving exercises, research tasks, or worksheets. The purpose of such homework is to encourage students to engage actively with the subject matter, reinforce learning, and build connections between prior knowledge and upcoming lessons (Schmidt *et al.*, 2011). Preparatory homework has been recognized as a valuable instructional strategy with the potential to improve students' academic performance. Research suggests that when students complete preparatory homework, they are better equipped to participate in class discussions, ask informed questions, and apply their knowledge during instructional activities (Van Voorhis, 2011). By previewing the material, students can identify areas of confusion or seek clarification during the lesson, thereby enhancing their comprehension and retention of the subject matter (Corno, 2000). Moreover, preparatory homework provides an opportunity for students to develop independent study skills, time management, and self-regulation, which are essential for academic success (Epstein & Van Voorhis, 2011). It encourages students to take responsibility for their learning and promotes a sense of ownership and engagement with the educational process.

However, it is important to note that the effectiveness of preparatory homework may depend on various factors, including the nature of the tasks assigned, the level of students' prior knowledge, and the support provided by teachers and parents (Trautwein & Köller, 2003). Additionally, the amount and frequency of preparatory homework should be balanced to prevent excessive workload and potential negative effects on students' well-being and motivation (Cooper *et al.*, 2006). Preparatory homework serves as a bridge between classroom instruction and independent learning. It allows students to preview upcoming content, activate prior knowledge, and develop a foundation for understanding new concepts (Bembenuddy & White, 2013). By engaging with preparatory homework, students can arrive at the classroom better prepared, which can lead to more meaningful and productive learning experiences.

Basic Science, on the other hand, is a fundamental subject in the Nigerian educational curriculum, aimed at equipping students with scientific knowledge and fostering critical thinking skills. However, concerns have been raised about the subpar academic performance of pupils in Basic Science in Ilorin West Local Government Area of Kwara State. As a result, there is a growing need to explore innovative approaches to improve students' academic outcomes in this subject. It is hypothesized that regular engagement in preparatory

homework can lead to improved academic performance in Basic Science among pupils in Ilorin West Local Government Area.

Despite the theoretical potential of preparatory homework, limited empirical research has been conducted on its effectiveness specifically in the context of Basic Science education in Ilorin West Local Government Area. Therefore, this study aims to investigate the effect of preparatory homework on pupils' academic performance in Basic Science. By exploring this relationship, the study seeks to contribute to the existing body of knowledge on effective educational practices and provide insights for educational policymakers, curriculum developers, and teachers in Kwara State (Sulyman, 2021; Sulyman, 2022; Sulyman & Abioye, 2023; Sulyman & Alawaye, 2024; Sulyman & Ayodele, 2024; Sulyman & Babalola, 2023).

Studies have explored the relationship between preparatory homework and pupils' academic performance, providing insights into the potential effects of this instructional strategy. Research has found a positive correlation between the completion of preparatory homework and improved academic performance among elementary school students (Brown & Dellinger, 2012). Similarly, significant associations were found between the frequency of preparatory homework completion and higher achievement scores in various subject areas among middle school students (Johnson *et al.*, 2015).

However, other studies have presented contrasting findings. A meta-analysis examining the impact of homework on academic performance across multiple grade levels found a positive correlation between homework completion and academic achievement, but the effect size was relatively small (Cooper *et al.*, 2006). Furthermore, the relationship between preparatory homework and academic performance may vary depending on subject area, pupil age, and the nature of assignments (Fernández-Alonso *et al.*, 2015).

In a Nigerian context, a study found a significant positive relationship between the completion of preparatory homework and improved academic performance in mathematics and English language subjects (Ibrahim & Abdullahi, 2019). The literature presents mixed findings regarding the effectiveness of preparatory homework. While some research suggests a positive association, others emphasize the importance of contextual factors.

It is essential to conduct further research in specific educational settings, such as Ilorin West Local Government Area, to examine the specific impact of preparatory homework on academic performance in Basic Science. This is because the academic performance of pupils in Ilorin West is an important area of study that requires attention and investigation. Ilorin West encompasses a diverse population of students with varying educational backgrounds, socio-economic statuses, and access to educational resources. Understanding the factors that influence pupils' academic performance in this area can contribute to the development of targeted interventions and educational policies aimed at improving learning outcomes.

The performance of pupils in Basic Science in Ilorin West Local Government provides insights into the effectiveness of science education and highlights factors that contribute to student achievement in the subject. Basic Science education aims to develop students' scientific knowledge, critical thinking abilities, and problem-solving skills. Understanding the variables that influence pupils' academic performance in Basic Science can help identify areas for improvement and guide educational strategies to enhance learning outcomes. Research has indicated that several factors affect pupils' performance in Basic Science, with teaching methodologies being a major influence. Instructional strategies that encourage active learning, hands-on experiments, and conceptual understanding have been shown to positively impact students' achievement (Adeyemi & Oludipe, 2013).

Understanding the differential effects of preparatory homework based on school type can help inform educational policies and strategies aimed at improving learning outcomes in Basic

Science across different school contexts in Ilorin West Local Government Area. By identifying the strengths and challenges associated with preparatory homework implementation in both public and private schools, educators and policymakers can develop targeted interventions and support systems to maximize the benefits of preparatory homework for all pupils.

Homework is a widely utilized instructional strategy; however, its impact on academic performance in Basic Science among pupils in Ilorin West remains understudied. Therefore, there is a need to investigate the relationship between preparatory homework and pupils' academic performance in Basic Science within this specific geographical area. Despite the potential benefits of preparatory homework in enhancing students' learning outcomes, the extent to which it influences pupils' academic performance in Basic Science in the Ilorin West Local Government Area remains unclear. Specific factors associated with preparatory homework (such as the nature of assignments, variation in school types, availability of resources, and teacher support) have not been extensively examined in this context.

As such, there is a gap in understanding how preparatory homework impacts pupils' academic performance in Basic Science, particularly within the context of Ilorin West Local Government Area. This study, therefore, examined the effect of preparatory homework on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State.

The following null hypotheses were formulated for this study; the decision was taken at the 0.05 level of significance:

- (i) H01: There is no significant effect of Preparatory Homework on Pupil's Academic Performance in Basic Science in Ilorin West Local Government Area of Kwara State.
- (ii) H02: There is no significant interaction effect of gender on pupils' Academic Performance in Literacy in the Ilorin Metropolis of Kwara State.
- (iii) H03: There is no significant interaction effect of Preparatory Homework, gender, and school type on pupils's Academic Performance in Basic Science in Ilorin West Local Government Area of Kwara State.

Novelties of the study are in the following:

- (i) Focus on Preparatory Homework in Basic Science at the Primary Level: Most existing studies on homework effectiveness focus on general subjects or higher education levels. This study uniquely investigates the impact of preparatory homework on Basic Science performance among primary school pupils, a relatively underexplored area.
- (ii) Context-Specific Investigation: The research is contextualized in Ilorin West Local Government Area, Kwara State, Nigeria, where there has been limited empirical evidence about the relationship between preparatory homework and academic achievement. This local focus adds geographic and cultural relevance to the global discussion on homework efficacy
- (iii) Comparison Across School Types and Gender: The study does not just evaluate preparatory homework alone, it also explores its interaction with gender and school type (public vs. private). This multidimensional analysis adds depth and allows for targeted policy recommendations based on school context.
- (iv) Use of Quasi-Experimental Design at the Primary Level: By adopting a pre-test, post-test, control group quasi-experimental design, the study provides more rigorous causal insights than simple correlational studies, especially within the primary school context.
- (v) Policy and Practice Implications for Local Educational Stakeholders: The findings challenge conventional assumptions that homework automatically improves performance, and provide evidence-based recommendations for teachers, curriculum developers, and policymakers in Nigeria and similar educational settings.

2. METHODS

This study adopted a pre-test, post-test, and control group quasi-experimental design. This design was considered appropriate because intact Primary Five classes were used to avoid disrupting regular classroom instruction. A $2 \times 2 \times 2$ factorial design was employed to test the null hypotheses. The first factor had two levels: experimental and control groups. The second factor was gender (male or female), and the third was school type (public or private).

A simple random sampling technique was used to select the schools that participated in both the experimental and control groups. Two schools were randomly selected for the experimental group and another two for the control group. Two instruments were used for data collection:

- (i) Basic Science Achievement Test (BSAT) based on the Primary Five Basic Science scheme of work. It consisted of 20 multiple-choice questions and served as the response instrument.
- (ii) Preparatory Homework Guide (PHP) – served as the stimulus instrument, used to guide the assigned homework tasks. It was validated by experts from the Department of Early Childhood and Primary Education.

The BSAT was subjected to both validity and reliability testing. Test-retest reliability was conducted, and the returned tests were used for data analysis. Descriptive statistics (frequency counts, means, and percentages) were used for demographic data and research questions. Inferential statistics (ANCOVA) were applied to test the hypotheses, with decisions made at the 0.05 level of significance.

3. RESULTS AND DISCUSSION

3.1. H01: There is no significant effect of preparatory home on pupil's academic performance in Ilorin West Local Government, Kwara State

Table 1 data shows the significant effect of preparatory homework on pupils' academic performance in Ilorin West Local Government, Kwara State. The finding revealed that there was no significant effect of preparatory homework on pupil's academic performance in Ilorin West Local Government, Kwara State ($F_{(1; 59)} = 0.45, P > 0.05$). The hypothesis is therefore not rejected in light of the result since the significant value (0.832) is more than 0.05. This implies that preparatory homework has no significant effect on pupils' academic performance.

3.2. H02: There is no significant effect of preparatory homework and gender on pupil's academic performance in Ilorin West Local Government, Kwara State.

Data in **Table 1** revealed the effect of gender on pupil's academic performance in Ilorin West Local Government, Kwara State. The finding shows that there was no significant effect of gender on pupils' academic performance in Ilorin East Local Government, Kwara State ($F_{(1; 59)} = 2.083; P > 0.05$). The hypothesis is therefore not rejected in light of the result since the significant value (0.155) is greater than 0.05. This implies that gender had no significant effect on pupils' academic performance.

3.3. H03: There is no significant effect of preparatory homework and gender on pupil's academic performance in Ilorin West Local Government, Kwara State.

Data in **Table 1** revealed the effect of practice homework and gender on pupil's academic performance in Ilorin West Local Government, Kwara State. The finding shows that there was no significant effect of practice homework and gender on pupils' academic performance in Ilorin West Local Government, Kwara State ($F_{(1; 59)} = 3.753; P > 0.05$). The hypothesis is therefore not rejected in light of the result since the significant value (0.058) is greater than

0.05. This implies that preparatory homework and gender had no significant effect on pupils' academic performance.

Table 1. Summary of analysis of covariance (ANCOVA) showing the significant effect of practice home on pupil's academic performance in Ilorin West Local Government, Kwara State.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	22.402a	4	5.601	1.332	0.270
Intercept	698.594	1	698.594	166.154	0.000
Pre_Test	0.998	1	0.998	0.237	0.628
Treatment	0.190	1	0.190	0.045	0.832
Gender	8.760	1	8.760	2.083	0.155
Treatment * Gender	15.778	1	15.778	3.753	0.058
Error	231.248	55			
Total	15903.000	60			
Corrected Total	253.650	59			

a. R Squared = .088 (Adjusted R Squared = .022)

In the study conducted in Ilorin West Local Government Area, Kwara State, the findings revealed no significant effects across several aspects of pupils' academic performance. Specifically, the research showed that preparatory homework did not have a significant effect on pupils' academic outcomes. This implies that assigning homework intended to prepare students for upcoming lessons did not result in a statistically significant improvement or decline in their academic performance. This finding contrasts with previous literature (Schmidt *et al.*, 2011), which reported that students who consistently engage in preparatory homework tend to perform better academically. Schmidt *et al.* (2011) study found that such homework enhances knowledge retention, improves concept comprehension, and contributes to better test performance. Similar conclusions were drawn in previous studies (Bassiri, 2012; Safadi & Rababah, 2012; Attarzadeh, 2011; Pishghadam & Ghadiri, 2011; Mehdiian, 2009; Chi, 2007). Furthermore, the study found no significant effect of gender on pupils' academic performance, indicating that male and female students in Ilorin West performed similarly. This aligns with the findings of Gbenga (2008), who reported no significant gender differences in pupils' performance on an energy conservation task. However, it contradicts other reports (Patra, 2005), who found that girls tended to outperform boys in the conservation of weight concept. Additionally, when examining the interaction between preparatory homework and gender, the study revealed no significant effect on academic performance. This suggests that the combination of preparatory homework and gender did not produce statistically significant differences in pupils' academic outcomes.

4. CONCLUSION

Based on the findings of this study conducted in Ilorin West Local Government Area of Kwara State, it was concluded that preparatory homework did not have a significant effect on pupils' academic performance in Basic Science. The results showed that assigning preparatory homework did not lead to measurable improvements in students' achievement. Similarly, gender was not found to have a significant impact on pupils' academic performance, indicating no notable difference between male and female learners in this context.

Furthermore, the interaction between preparatory homework and gender did not produce any significant effect on academic outcomes. These findings challenge the general assumptions that preparatory homework and gender inherently influence academic performance. Therefore, educators and policymakers should consider exploring more holistic and context-specific approaches to improve academic performance, especially in Basic Science. Future research is encouraged to investigate other variables such as teaching quality, classroom engagement, parental involvement, and learner motivation, which may better explain variations in academic achievement. In the light of the results of the study, the following recommendations are offered:

- (i) The teacher should ensure that preparatory homework is equal among pupils in the classroom. Educators should focus on the quality of homework assignments rather than quantity. Homework tasks should be engaging, relevant, and tailored to individual students' needs.
- (ii) Curriculum Designers and developers should utilize a significant amount of preparatory homework. They should enrich the curriculum based on these techniques.
- (iii) The homework should be suited to the pupils' interests, needs, and abilities and should be less complex.
- (iv) In brief, we recommend that teachers, designers, and supervisors take preparatory homework more into account.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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