



Effect of Preparatory Homework on Pupils Academic Performance in Basic Science

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ABSTRACT

This study investigated the effect of preparatory homework on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State, Nigeria. A pretest-posttest quasi-experimental design with control and experimental groups was employed. Using simple random sampling, two private and two public schools were selected. Data were collected using the Basic Science Achievement Test and Preparatory Homework Guide, with reliability established through Pearson Product-Moment Correlation. Data were analyzed using descriptive statistics and Analysis of Covariance. The findings showed no significant effects of preparatory homework, gender, or their interaction on pupils' academic performance. The study recommends the strategic use of preparatory homework and further evaluation of its instructional value.

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1. INTRODUCTION

One strategy that may support pupils' learning is preparatory homework. Preparatory homework refers to tasks assigned before a lesson to introduce upcoming content, activate prior knowledge, and prepare pupils for classroom instruction. When properly designed, preparatory homework can encourage active engagement, independent learning, responsibility, and problem-solving skills. It may also help pupils identify areas of difficulty before the lesson, allowing them to participate more actively in class discussions and seek clarification during instruction. Previous studies have suggested that homework can support comprehension, retention, self-regulation, and time management when tasks are meaningful, appropriate, and supported by teacher guidance (Corno, 2000; Trautwein and Köller, 2003). However, excessive or poorly designed homework may reduce pupils' motivation and well-being (Cooper et al., 2006).

Empirical findings on the effect of homework on academic achievement remain mixed. Some studies have reported positive associations between homework completion and students' academic performance (Brown and Dellinger, 2012; Johnson et al., 2015). Similarly, local research in Nigeria has shown a positive relationship between preparatory homework and pupils' performance in Mathematics and English Language (Ibrahim and Abdullahi, 2019). However, other studies suggest that the effect of homework may be modest and dependent on task quality, learner characteristics, teacher support, subject area, and learning context. Therefore, the effectiveness of preparatory homework cannot be assumed across all subjects and educational settings.

In the context of Basic Science in Ilorin West Local Government Area, limited empirical attention has been given to how preparatory homework affects pupils' academic performance. Factors such as school type, availability of learning resources, teacher support, and pupils' gender may also influence learning outcomes. Previous related studies have examined educational issues such as homework, pupils' achievement, classroom practices, learning outcomes, and early childhood education in Nigerian contexts (Sulyman, 2017, 2021, 2022, 2023; Sulyman and Abioye, 2023; Sulyman and Babalola, 2023; Sulyman and Daguduro, 2020; Sulyman and Oladoye, 2022; Sulyman et al., 2022). Nevertheless, the specific effect of preparatory homework on pupils' academic performance in Basic Science within Ilorin West remains unclear. 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, Nigeria. The following null hypotheses were tested at the 0.05 level of significance:

- (i) H01: There is no significant effect of preparatory homework on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State.
- (ii) H02: There is no significant effect of gender on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State.
- (iii) H03: There is no significant interaction effect of preparatory homework and gender on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State.

2. METHODS

This study adopted a pretest-posttest control group quasi-experimental design to examine the effect of preparatory homework on pupils' academic performance in Basic Science. This design was considered appropriate because intact Primary Five classes were used to avoid disrupting regular classroom instruction. A 2×2 factorial design was employed to test the null

hypotheses. The first factor was treatment condition, consisting of the experimental and control groups, while the second factor was gender, consisting of male and female pupils.

The study was conducted in Ilorin West Local Government Area of Kwara State, Nigeria. A simple random sampling technique was used to select the participating schools. Two schools were assigned to the experimental group, while two schools were assigned to the control group. Pupils in the experimental group were exposed to preparatory homework, while pupils in the control group received regular instruction without the preparatory homework intervention.

Two instruments were used for data collection: the Basic Science Achievement Test (BSAT) and the Preparatory Homework Guide (PHG). The PHG served as the stimulus instrument and was validated by lecturers in the Department of Early Childhood and Primary Education. The BSAT served as the response instrument and was used to measure pupils' academic performance in Basic Science. The test items were developed from the Primary Five Basic Science scheme of work and consisted of 20 multiple-choice questions. The BSAT was subjected to validity and reliability testing before administration.

Data were collected through pretest and posttest administration. The pretest was conducted before the intervention to determine pupils' initial academic performance in Basic Science, while the posttest was conducted after the intervention to determine changes in performance. Data were analyzed using descriptive statistics, including frequency counts, means, and percentages. Inferential analysis was conducted using Analysis of Covariance (ANCOVA) to test the hypotheses at the 0.05 level of significance.

3. RESULTS AND DISCUSSION

The hypotheses were tested using Analysis of Covariance (ANCOVA) to determine the effect of preparatory homework, gender, and the interaction between preparatory homework and gender on pupils' academic performance in Basic Science. Pupils' posttest scores were used as the dependent variable, while pretest scores were treated as the covariate. The ANCOVA result is presented in Table 1. The effect of treatment was not statistically significant, $F(1, 55) = 0.045$, $p = 0.832$. Since the p -value was greater than 0.05, the first null hypothesis was not rejected. This result indicates that preparatory homework did not have a significant effect on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State.

Table 1. Summary of Analysis of Covariance showing the effect of preparatory homework on pupils' academic performance in Basic Science.

SOURCE	TYPE III SUM OF SQUARES	df	MEAN SQUARE	F	SIG.
Corrected model	22.402	4	5.601	1.332	0.270
Intercept	698.594	1	698.594	166.154	0.000
Pretest	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	4.205		
Total	15903.000	60			
Corrected total	253.650	59			

Note: $R^2 = 0.088$; adjusted $R^2 = 0.022$.

The effect of gender was also not statistically significant, $F(1, 55) = 2.083$, $p = 0.155$. Therefore, the second null hypothesis was not rejected. This finding indicates that male and female pupils did not differ significantly in their academic performance in Basic Science. In practical terms, pupils' performance in the study was not determined by gender, suggesting that instructional support should be directed toward all learners rather than designed based on gender assumptions.

The interaction effect between treatment and gender was likewise not statistically significant, $F(1, 55) = 3.753$, $p = 0.058$. Since the p-value was greater than 0.05, the third null hypothesis was not rejected. Although the p-value was close to the significance threshold, the result indicates that preparatory homework did not produce significantly different effects for male and female pupils.

The corrected model was not statistically significant, $F(4, 55) = 1.332$, $p = 0.270$, with an adjusted R^2 of 0.022. This means that the model explained only a small proportion of the variance in pupils' academic performance. The findings suggest that preparatory homework, gender, and their interaction were not strong predictors of pupils' performance in Basic Science within the context of this study.

These findings challenge the assumption that preparatory homework automatically improves academic achievement. Although preparatory homework can help pupils preview lesson content, activate prior knowledge, and prepare for classroom participation, its effectiveness depends on task quality, pupils' prior knowledge, teacher guidance, home support, and consistency of completion. This interpretation is consistent with studies emphasizing that the relationship between homework and achievement is complex and depends on the design, purpose, and context of homework activities (Cooper et al., 2006; Trautwein and Köller, 2003).

The findings differ from studies that reported positive associations between homework completion and academic achievement (Brown and Dellinger, 2012; Johnson et al., 2015). They also contrast with local findings showing a positive relationship between preparatory homework and pupils' performance in Mathematics and English Language in Nigerian schools (Ibrahim and Abdullahi, 2019). These differences may be due to subject area, implementation procedure, pupils' learning conditions, teacher support, or the specific nature of Basic Science tasks used in the present study.

In summary, preparatory homework did not significantly affect pupils' academic performance in Basic Science, and gender did not significantly influence performance. The non-significant interaction effect also suggests that preparatory homework did not produce different outcomes across gender groups. Nevertheless, this does not mean that preparatory homework has no instructional value. Rather, it suggests that teachers should use preparatory homework strategically by ensuring that assignments are meaningful, aligned with lesson objectives, appropriate to pupils' abilities, and supported by feedback during classroom instruction.

4. CONCLUSION

This study examined the effect of preparatory homework on pupils' academic performance in Basic Science in Ilorin West Local Government Area of Kwara State, Nigeria. The findings showed that preparatory homework had no significant effect on pupils' academic performance. Gender also had no significant effect, and the interaction between preparatory

homework and gender was not statistically significant. These results indicate that preparatory homework, as implemented in this study, did not produce measurable improvement in pupils' Basic Science performance. Although the findings were non-significant, preparatory homework may still have instructional value when it is carefully designed, aligned with lesson objectives, appropriate to pupils' abilities, and supported by teacher feedback. Teachers should therefore focus on the quality and relevance of homework rather than the quantity of assigned tasks. Future studies may examine other factors, such as teacher support, pupils' motivation, school type, and home learning environment, to better understand how homework can contribute to science learning outcomes.

5. AUTHORS' NOTE

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

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