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Effect of Guided Inquiry Strategy on Academic Achievement among Social Studies students in Upper Basic schools in Edo State

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Abstract

This study investigated the effect of guided inquiry instructional strategy on academic achievement in Social Studies among Upper Basic School students in Edo State, Nigeria. Guided by three research questions and three hypotheses, the study employed a quasi-experimental pretest-posttest non-equivalent control group design, arranged within a 2x2 factorial matrix focusing on instructional strategy and gender. The population comprised 49,796 Upper Basic 2 students enrolled in public secondary schools across Edo State. Using a multi-stage sampling technique, a total of 450 students (220 males and 230 females) were selected from the three senatorial districts: Edo North, Edo South, and Edo Central. Data were collected using the Social Studies Achievement Test (SSAT), a 40-item multiple-choice instrument validated by experts, with a reliability coefficient of 0.87 determined using Kuder-Richardson Formula 20 (KR-20). Data analysis was conducted using descriptive statistics, paired sample t-tests, and Analysis of Covariance (ANCOVA) at a 0.05 significance level. The findings revealed that students exposed to guided inquiry strategy performed significantly better than those taught using conventional methods. Additionally, male students in the guided inquiry group achieved higher posttest scores than their female counterparts, while females performed better in the conventional group. However, there was no statistically significant interaction effect between instructional strategies and gender on students' academic achievement. The study recommended the adoption of guided inquiry strategy to improve Social Studies learning outcomes and the application of gender-sensitive approaches in classroom instruction.

Keywords: Guided Inquiry; Social Studies; Academic Achievement; Gender Differences; Instructional Strategies; Upper Basic Schools

1. Introduction

The importance of instructional strategies in shaping students' academic outcomes has long been emphasized in educational research. Guided inquiry, as a learner-centered teaching approach, fosters students' active engagement, critical thinking, and problem-solving skills—qualities essential to effective Social Studies instruction. Guided inquiry is a pedagogical approach that encourages students to explore, ask questions, and develop solutions under the teacher's guidance (Orosz et al., 2023). This method contrasts sharply with traditional or conventional strategies that rely on teacher-led instruction and passive student learning. According to Lee et al. (2023) guided inquiry allows learners to construct knowledge through exploration and reflection, resulting in deeper understanding and improved retention. In the context of Social Studies, which emphasizes analytical thinking and civic competence, guided inquiry could provide opportunities for learners to investigate real-life issues, develop arguments, and engage in meaningful discourse.

Numerous studies appear to have confirmed the positive impact of inquiry-based learning on students' academic achievement. Academic achievement refers to the extent to which a student has achieved their short or long-term educational goals, typically measured through indicators such as grades, test scores, and overall mastery of subject

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content. It reflects not only the acquisition of knowledge but also the application, synthesis, and evaluation of that knowledge in relevant contexts. For instance, Ural (2016) reported that students who engaged in guided inquiry demonstrated improved conceptual understanding and higher achievement scores compared to those taught with conventional methods. This suggests that inquiry-based strategies enhance learners' ability to connect with content meaningfully and perform better academically. Similarly, Grant et al. (2022) argued that inquiry-oriented teaching fosters autonomy and enhances comprehension of abstract concepts, which are central to Social Studies. By encouraging students to ask questions, investigate problems, and develop their own interpretations, guided inquiry equips learners with critical thinking and problem-solving skills essential for sustained academic success.

The influence of gender on learning outcomes remains a critical area of educational research. While some studies suggest that gender differences in academic performance may be narrowing, others maintain that instructional strategies may interact differently with male and female students. According to Sokołowska (2018), no statistically significant difference was detected in T1 scores between boys and girls, and in a normalized change between groups of different abilities, as well as between genders. On the other hand, boys may perform better in more competitive or structured settings, depending on the learning context. However, empirical evidence regarding gender differences in response to guided inquiry strategies is mixed. Kuo et al. (2020) found that guided inquiry strategy enhanced male students' motivation and engagement by connecting learning to real-life applications. However, female students experienced higher exam anxiety and lower cognitive engagement, influenced by math-related fear and a heightened concern for accuracy and classroom pride. The influence of gender on instructional strategies is a factor that could impact a particular outcome such as academic achievement. Exploring the interaction between these variables helps to determine whether the impact of one variable such as teaching strategy depends on gender. According to Ješková et al. (2022), understanding such interactions is essential for tailoring instruction to diverse learners' needs and improving learning outcomes across demographic groups. Studies have indicated that the effectiveness of teaching strategy like guided inquiry may vary when combined with gender-related learning preferences. For example, Owolade et al. (2022) observed that while guided inquiry significantly improved students' academic performance, the degree of improvement varied slightly between genders based on classroom dynamics and the nature of tasks. The interaction effect is particularly relevant in Social Studies, where learning involves both cognitive and affective domains.

Conventional instructional strategies typically include lecture-based methods, rote learning, and teacher-centered delivery. These methods, though still prevalent, have been criticized for failing to actively engage students in the learning process. According to Koolivand et al. (2024), the conventional teaching method is an instructor-centered approach in which the teacher serves as the primary source of knowledge, conveying information through lectures, demonstrations, and structured presentation. Students typically play a passive role, listening and taking notes, while learning outcomes are primarily measured via standardized assessments such as exams and quizzes. According to Castillo (2024), while conventional teaching may cover curriculum content effectively, it often does not foster deep understanding, critical thinking, or problem-solving skills. In Social Studies, where student participation and inquiry are essential, such methods may fall short of achieving meaningful learning outcomes. This further highlights the relevance of exploring alternative strategy such as guided inquiry.

The reviewed literature affirms that guided inquiry holds significant potential in improving academic achievement among Social Studies students, which could offer an interactive and reflective learning process. The method appears to support both male and female learners, although gender-based variations may exist. Additionally, the possible interaction between instructional strategies and gender on learning outcomes underscores the need for empirical investigation to inform instructional design. By aligning with the specific objectives of the current study, this review provides a conceptual framework for examining how guided inquiry strategies influence learning in Social Studies classrooms across Upper Basic Schools in Edo State.

1.1. Purpose of the Study

The main purpose of this study was to examine the effect of guided inquiry and conventional instructional strategies on students' academic achievement in Social Studies in Edo State. The specific objectives of the study are to:

- Ascertain the difference between the pretest and post-test mean academic achievement scores of students taught Social Studies concepts using guided inquiry and conventional instructional strategies.
- Determine the difference in the academic achievement scores of male and female students taught Social Studies using guided inquiry and conventional instructional strategies.
- Investigate the interaction effect of instructional strategies and gender on the academic achievement scores of students in Social Studies.

1.2. Research Questions

The following research questions guided the study:

- What is the difference between the pretest and post-test mean academic achievement scores of students taught Social Studies concepts using guided inquiry and conventional instructional strategies?
- What is the difference in the academic achievement scores of male and female students taught Social Studies using guided inquiry and conventional instructional strategies?
- What is the interaction effect of instructional strategies and gender on the academic achievement scores of students in Social Studies?

1.3. Hypotheses

The following hypotheses were tested at 0.05 level of significance.

- There is no significant difference between the pretest and post-test mean academic achievement scores of students taught Social Studies concepts using guided inquiry and conventional instructional strategies.
- There is no significant difference in the academic achievement scores of male and female students taught Social Studies using guided inquiry and conventional instructional strategies.
- There is no significant interaction effect of instructional strategies and gender on the academic achievement scores of students in Social Studies.

2. Methodology

This study adopted the pretest-post-test non-equivalent control group design which is a sub-type of quasi-experimental design structured into the 2 x 2 factorial design matrix. This consist of two instructional strategies-Guided inquiry and conventional, and Gender- male and female. The primary instrument used for data collection in this study was the Social Studies Achievement Test (SSAT), which was developed by the researcher. The SSAT consisted of 40 multiple-choice items derived from the topics covered in the Upper Basic Social Studies curriculum. Each test item contained four options (A-D), with only one correct answer. The instrument was specifically designed to measure students' cognitive achievement in core concept areas relevant to the Social Studies curriculum.

To ensure the validity of the instrument, the SSAT was subjected to face and content validation by three academic experts—two from the field of Social Studies Education and one from the Department of Measurement and Evaluation at the University of Benin. These experts reviewed the test items in terms of relevance, clarity, and alignment with the curriculum objectives and the research questions guiding the study. Based on their evaluations and recommendations, some of the test items were revised for improved clarity and alignment with curriculum standards.

To determine the reliability of the SSAT, a pilot study was conducted using a sample of 30 Upper Basic School students who were not part of the main study. The reliability of the instrument was calculated using the Kuder-Richardson Formula 20 (KR-20), which yielded a reliability coefficient of 0.81, indicating a high level of internal consistency and reliability.

Data collection was carried out over a period of six weeks and followed three major phases. In the first phase, the SSAT was administered to both the experimental and control groups as a pretest to establish their baseline equivalence in academic achievement. The second phase involved the treatment, where the experimental group, comprising 250 students, was exposed to the guided inquiry instructional strategy, while the control group, comprising 200 students, was taught using the conventional lecture method. Both groups were taught the same Social Studies content, and the lessons were delivered by trained Social Studies teachers under the close supervision of the researcher to ensure uniformity and fidelity to the instructional strategies. In the third and final phase, the SSAT was re-administered to both groups as a post-test to assess the effects of the instructional strategies on students' academic achievement.

Prior to data collection, ethical approval was sought and obtained from the Edo State Ministry of Education. In addition, permission was obtained from the principals of the selected public Upper Basic Schools. All participants were informed about the objectives of the study and were assured of their confidentiality, anonymity, and the voluntary nature of their participation. No personal identifiers were collected during the administration of the instrument, thereby ensuring compliance with ethical research standards.

The data collected from the pretest and post-test were analyzed using both descriptive and inferential statistical techniques. Descriptive statistics such as mean and standard deviation were used to answer the research questions. For hypothesis testing, paired sample t-tests were employed to compare pretest and post-test scores within each group, thereby determining whether significant gains were made as a result of the treatment. Analysis of Covariance (ANCOVA) was used to compare post-test scores between the experimental and control group while statistically controlling the influence of pretest scores. Additionally, Two-Way ANCOVA was utilized to determine whether there was a significant interaction effect between the instructional strategies and gender on students' academic achievement. All hypotheses were tested at the 0.05 level of significance, and all analyses were performed using SPSS version 23.

Through this comprehensive methodological framework, the study rigorously examined the effectiveness of guided inquiry strategies in enhancing the academic achievement of Social Studies students in Upper Basic schools in Edo State compared to the conventional lecture method.

Table 1 Design of the Study

Groups (Instructional Strategies)	Pretest	Treatment	Posttest
Guided Inquiry Group	O ₁	X ₁ (Guided Inquiry Strategy)	O ₂
Conventional Group	O ₁	X ₂ (Conventional Strategy)	O ₂

Key: O₁ represents the pretest observation for both the guided inquiry and conventional groups; O₂ represents the posttest observation for both groups; X₁ represents the use of the guided inquiry instructional strategy for the experimental group (250 students); X₂ represents the use of the conventional instructional strategy for the control group (200 students).

Table 2 Sample Distribution by Group, School Location and Sex

Instructional Strategies	Name of Schools	School Location	Male	Female	Total
Guided Inquiry	C	Rural	70	30	100
	D	Urban	80	70	150
Total (Guided Inquiry)			150	100	250
Conventional	E	Rural	50	50	100
	F	Urban	50	50	100
Total (Conventional)			100	100	200
Grand Total			250	200	450

Source: Edo State Post Primary Schools Board (2023 Census)

2.1. Hypothesis One

There is no significant difference between the pretest and posttest mean academic achievement scores of students taught Social Studies concepts using guided inquiry and conventional instructional strategies.

Table 3 Mean and Standard Deviation of Pretest and Posttest Academic Achievement of Students

	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Mean Gain
Guided Inquiry	250	13.36	4.48	16.08	4.95	2.72
Conventional (Control)	200	12.38	4.33	14.33	3.65	1.95

The data in Table 3 presents the mean and standard deviation of the pretest and posttest academic achievement scores of students taught Social Studies concepts using guided inquiry and conventional instructional strategies. The guided inquiry group recorded a pretest mean of 13.36 with a standard deviation of 4.48 and a posttest mean of 16.08 with a standard deviation of 4.95, yielding a mean gain of 2.72. The conventional group had a pretest mean of 12.38 and a

standard deviation of 4.33, a posttest mean of 14.33 and a standard deviation of 3.65, resulting in a mean gain of 1.95. The results indicate that students in both instructional groups demonstrated improved academic achievement at posttest compared to pretest. However, the guided inquiry strategy showed a higher impact on students' achievement with a greater mean gain compared to the conventional method.

To confirm the statistical significance of the differences in academic achievement, a paired sample t-test was conducted, and the results are presented below.

Table 4 Paired Sample t-test Summary of Pretest and Posttest Students' Academic Achievement

Strategies	Tests	N	Mean Gain	Standard Deviation	df	t-cal	Sig (2-tailed)
Guided Inquiry	Pretest	250	2.71	7.43	145	4.409	.000
	Posttest						
Conventional	Pretest	200	1.95	6.00	128	3.68	.000
	Posttest						

Table 4 shows the paired sample t-test analysis of students' pretest and posttest academic achievement in Social Studies using guided inquiry and conventional strategies. For the guided inquiry group, the calculated t-value is 4.409 with a significance value of .000 at 145 degrees of freedom, which is significant at the 0.05 alpha level. For the conventional group, the t-value is 3.68 with a significance value of .000 at 128 degrees of freedom, also significant at the 0.05 level. Based on these results, the null hypothesis of no significant difference between pretest and posttest scores is rejected. This implies that both instructional strategies significantly improved students' academic achievement in Social Studies, with guided inquiry showing greater effectiveness.

2.2. Hypothesis Two

There is no significant difference in the academic achievement scores of male and female students taught Social Studies using guided inquiry and conventional instructional strategies.

Table 5 Mean and Standard Deviation of Students' Academic Achievement Based on Sex

Groups	Sex	N	Pretest Mean	SD	Posttest Mean	SD	Mean Gain
Guided Inquiry	Male	150	12.99	4.28	17.07	5.08	4.03
	Female	100	13.69	4.65	15.21	4.69	1.52
Conventional (Control)	Male	100	13.37	5.09	14.35	3.64	0.98
	Female	100	11.83	3.77	14.31	3.67	2.48

Table 5 contains the mean and standard deviation of students' academic achievement in Social Studies concepts taught using guided inquiry and conventional instructional strategies by sex. The results reveal that in the guided inquiry group at pretest, the males had a mean of 12.99 and a standard deviation of 4.28. At posttest, the males had a mean of 17.07 and a standard deviation of 5.08, resulting in a mean gain of 4.03. Their female counterparts in the group had a mean of 13.69 and a standard deviation of 4.65 at pretest, and a posttest mean of 15.21 with a standard deviation of 4.69, making a pretest-posttest mean gain of 1.52. In the conventional group, the males had a mean of 13.37 and a standard deviation of 5.09 at pretest, a mean of 14.35 and a standard deviation of 3.64 at posttest, giving rise to a pretest-posttest mean gain of 0.98. While their female counterparts had a mean of 11.83 and a standard deviation of 3.77 at pretest, a mean of 14.31 and a standard deviation of 3.67 at posttest, resulting in a mean gain of 2.48. This implies that the guided inquiry strategy improved male academic achievement more than the females, while the conventional strategy improved female achievement more than the males.

To determine whether the observed differences were statistically significant, a preliminary t-test was conducted on the pretest scores, yielding $t = 1.713$, $df = 273$, $p = .037$, which was significant at the 0.05 alpha level. Since a significant difference was found at the pretest, Analysis of Covariance (ANCOVA) was used to test the hypothesis.

Table 6 Analysis of Covariance (ANCOVA) of Students' Academic Achievement Based on Sex

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1468.878a	3	489.626	12.998	0.000	0.146
Intercept	12145.146	1	12145.146	322.511	0.000	0.548
Pretest (Covariate)	153.155	1	153.155	4.067	0.045	0.015
Sex	784.349	1	784.349	20.828	0.000	0.071
Error	10277.744	273	37.647			
Total	134526.000	278				
Corrected Total	11746.622	277				

a. R Squared = .146 (Adjusted R Squared = .138)

Table 6 shows the ANCOVA analysis of students' academic achievement in Social Studies concepts taught using guided inquiry and conventional instructional strategies based on sex. The result indicates that $F(1, 273) = 20.828, p = .000$, which is significant at the 0.05 alpha level. The result also revealed that sex accounted for 7.1% of the observed variance in the dependent variable. Therefore, the null hypothesis of no significant difference is rejected. This means that there is a significant difference in the academic achievement of male and female students taught Social Studies using guided inquiry and conventional instructional strategies.

2.3. Hypothesis Three

There is no significant interaction effect of instructional strategies and gender on the academic achievement scores of students in Social Studies.

Table 7 Mean and Standard Deviation of Interaction of Instructional Strategies and Gender on Students' Post-test Academic Achievement

Instructional Strategies	Gender	N	Post-test Mean	SD
Guided Inquiry	Male	150	16.04	4.89
	Female	100	15.71	4.79
Conventional	Male	100	14.35	3.79
	Female	100	14.31	3.72

Table 7 displays the mean and standard deviation of the interaction effect of instructional strategies and gender on students' post-test academic achievement scores in Social Studies. For students taught using guided inquiry, males ($N = 68$) had a post-test mean of 16.04 with a standard deviation of 4.89, while females ($N = 78$) had a mean score of 15.71 and a standard deviation of 4.79. Among students taught with the conventional strategy, males ($N = 46$) recorded a mean score of 14.35 with a standard deviation of 3.79, while females ($N = 83$) had a mean score of 14.31 and a standard deviation of 3.72.

To test for the statistical significance of the interaction effect of instructional strategies and gender on academic achievement, a two-way ANCOVA was conducted. The results are shown in Table 8.

Table 8 Two-Way ANCOVA Result on Interaction Effect of Instructional Strategies and Gender on Academic Achievement

Source of Variation	Sum of Squares	df	Mean Square	F	p-value	Decision
Strategies	1894.56	2	947.28	62.13	0.000	Significant
Gender	14.38	1	14.38	0.94	0.333	Not Significant
Strategies * Gender	10.57	2	5.29	0.35	0.704	Not Significant
Error	5223.81	342	15.27			
Total	24025.91	348				

From Table 8, the p-value for the interaction between instructional strategies and gender is 0.704, which is greater than the 0.05 level of significance. Thus, the null hypothesis is not rejected. This indicates that there is no significant interaction effect of instructional strategies and gender on the academic achievement scores of students in Social Studies.

3. Discussion of Findings

The findings revealed that students taught with both guided inquiry and conventional strategies improved significantly from pretest to posttest. However, those taught using the guided inquiry strategy showed greater academic gains than their counterparts in the conventional group. This suggests that guided inquiry is a more effective instructional approach in enhancing students' academic achievement in Social Studies. This finding aligns with the work of Owolade et al. (2022) who found that both guided inquiry and open inquiry instructional strategies significantly improved students' achievement in Biology compared to traditional methods. The study highlighted that guided inquiry was particularly effective in providing structured support, while open inquiry encouraged learner autonomy. Similarly, Simonson (2023) found that Process Oriented Guided Inquiry Learning (POGIL) significantly enhances students' critical thinking, problem-solving skills, and conceptual understanding. The study emphasized that POGIL fosters collaboration, learner autonomy, and deeper engagement with content, making it a powerful approach for learner empowerment across disciplines.

The results showed a statistically significant difference in the academic achievement of male and female students. Specifically, male students in the guided inquiry group outperformed their female counterparts, while in the conventional group, female students showed higher gains than males. This indicates that gender plays a role in how students respond to different instructional strategies, with males seemingly benefiting more from inquiry-based methods. This is in disagreement with the findings of Sokołowska (2018) who found no significant gender differences in academic performance across ability groups. While boys may excel in competitive or structured learning contexts, this advantage is context-dependent. Evidence on gender response to guided inquiry strategies remains inconclusive. Overall, gender does not consistently predict performance outcomes. In support of this position, Strzelecki and ElArabawy (2024) found that gender had a moderating effect on the acceptance and use of generative AI among higher education students. Specifically, male students demonstrated higher acceptance and more frequent use of generative AI tools compared to female students in both Poland and Egypt.

The findings revealed that there is no significant interaction effect between instructional strategies and gender on students' academic performance. This implies that while instructional strategies and gender independently influenced achievement, their combination did not produce any compounded or synergistic effect on performance. In other words, the effectiveness of the teaching strategy did not significantly depend on whether the student was male or female. This finding agrees with Senad et al. (2021) who found no significant interaction effect between instructional strategies and gender on students' academic performance. They reported that both male and female students benefited similarly from language learning strategies. The study revealed that academic achievement was more influenced by individual strategy use than by gender. In disagreement with this view, Rudhumbu (2022) found that the interaction between gender and instructional strategies significantly influenced academic achievement in university settings. Female students benefited more from interactive and participatory teaching methods, while traditional, lecture-based strategies tended to favor male students. The study highlights that gender-responsive instructional strategies can bridge achievement gaps. It emphasizes the need for inclusive teaching practices that address diverse learning needs.

4. Conclusion

The study investigated the effects of instructional strategies and gender on students' academic achievement in Social Studies. The findings indicate that both guided inquiry and conventional instructional strategies enhance students' academic achievement, but guided inquiry proves more effective. The study also found that gender plays a role in students' academic performance, with male students performing better in guided inquiry settings and female students achieving more under conventional methods. However, no significant interaction was observed between instructional strategies and gender, suggesting that the effectiveness of a teaching strategy operates independently of gender.

Recommendations

Based on the findings of this study, the following recommendations were made:

- Teachers of Social Studies should adopt guided inquiry instructional strategies more regularly to improve students' academic performance, as it promotes engagement, critical thinking, and independent learning.
- Curriculum developers and education policymakers should incorporate guided inquiry methods into teacher training programs and instructional guides to ensure a systematic and consistent application in the classroom.
- Gender-responsive teaching strategies should be encouraged, enabling teachers to address the different learning preferences of male and female students without reinforcing gender stereotypes.
- School administrators should organize workshops and seminars that focus on innovative instructional strategies, such as guided inquiry, to equip teachers with modern pedagogical skills.
- Further research should be conducted to explore other moderating variables such as socioeconomic status, school type, and learning environment that may influence the effectiveness of instructional strategies in Social Studies.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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