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Advancing Inclusive Science Learning through Demonstration-Enriched Team–Pair–Solo Pedagogy: Differential Effects on Academic Performance among Varied-Ability Upper Basic Students

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Abstract

This study examined whether integrating demonstrations into Team-Pair-Solo instructional strategy could improve science academic performance among upper basic students with different ability levels compared with conventional instruction. The study was motivated by the persistent challenge of student unsatisfactory academic performance associated with conventional instructional approaches. 2 objectives, research questions with their corresponding null hypotheses were formulated to guide the study. The design of the study was pretest-posttest non-equivalent quasi-experimental. The population comprised all the public Basic II students in Zaria education zone, totaling 6,684 students. Sample of 165 students from two randomly selected schools were used for the study. The experimental group was taught energy concepts using demonstration+TPS strategy, while the control group was taught using the conventional method. The instruments; Energy Concepts Performance Test (ECPT) was validated through expert review. Reliability was determined using the PPMC with reliability coefficient of 0.756 used for the data collection. Research questions were answered using bar charts and descriptive statistics while Quade's ANCOVA statistics was used to test the null hypotheses at $\alpha=0.05$ level of significance. Findings revealed that; (1) the results ($F(1, 160) = 28.21$, $p < .001$.) indicates a significant difference in posttest performance between the experimental and control groups. (2) the result ($F(2, 75) = 22.886$, $p < .001$.) indicate that varied ability level had a statistically significant effect on students' posttest performance scores in the experimental group in favor of high-abilities. It was concluded that; Demonstration+TPS was found to be helpful in enhancing students' performance. The students' ability levels also enhanced the effectiveness of demonstration+TPS. It was therefore recommended among others that; BST teachers should adopt the demonstration+TPS strategy in teaching energy and other related concepts.

Keywords: inclusive science learning, demonstration+TPS, varied ability, performance, energy

1 Introduction

The introduction should be succinct and contain no subheadings. This section should present background for the study, Science is the systematic study of the natural world, employing observation, experimentation, and reasoning to generate knowledge that addresses societal challenges (Adamu, 2021). It is central to technological advancement and national development, with core subjects such as Biology, Chemistry, and Physics forming the foundation for STEM careers. According to Journal of Contemporary Education Research (2026) these disciplines are introduced early through BST, which lays the groundwork for understanding concepts like energy, matter, and the environment. Despite its importance, students' academic performance in BST has remained poor over the years (Mgbomo et al., 2024), with failure rates higher than in other subjects (Oludipe & Oludipe, 2021). Academic performance, defined as achievement across cognitive, affective, and psychomotor domains (Faniyi, 2023), is hindered by factors such as ineffective teaching methods, inadequate facilities, unequal access to quality instruction, large class sizes, learner diversity, and socioeconomic disparities.

Instructional strategies are critical in addressing these challenges. The demonstration method, according to Yousufzai (2023), enhances understanding by linking theory with practice, promoting interest, retention, and problem-solving skills, but risks passive learning if students only observe. Conversely, according to Josiah and Shedow (2020) the TPS cooperative learning strategy, grounded in Vygotsky's scaffolding theory, fosters active participation, collaboration, and independent mastery. While both strategies have proven effective individually, they face criticisms when used in isolation. Integrating them into a demonstration+TPS approach combines teacher-led explanation with collaborative and independent practice, offering scaffolding, peer support, and gradual release of responsibility (Hattie, 2023; Kagan & Kagan, 2017; UNESCO, 2021). This integration is expected to improve engagement, conceptual understanding, and retention, while accommodating varied-ability learners.

Inclusive classrooms require strategies that meet the diverse needs of low-, medium-, and high-ability students. Tomlinson (2023) and UNESCO (2020) were of the view that low achievers benefit from scaffolding, medium achievers need consolidation, and high achievers require enrichment to sustain engagement). Ability grouping within cooperative learning encourages peer support and targeted instruction, improving participation and achievement (Olawuwo et al., 2024). However, limited studies have examined the combined effect of demonstration+TPS in BST, particularly across different ability groups. This gap restricts understanding of how integrated approaches can support inclusive science learning. Therefore, this study aims to determine the effect of demonstration+TPS strategy on the academic performance of Upper Basic students, focusing on overall mean scores and differences among high, average, and low achievers.

Empirical studies support these claims. Sa'adu and Aliyu (2017) found that activity-based and demonstration method significantly improved BST performance among primary pupils compared to conventional teaching. Nnorom (2017) reported that guided inquiry produced higher science process skill acquisition than demonstration among biology students, while Achimugu (2018) showed that enriched demonstration strategies led to significantly higher achievement in Chemistry compared to traditional lectures, with no gender differences observed. These findings highlight the potential of demonstration-based approaches to enhance science learning outcomes. Parallel research on cooperative learning strategies has emphasized the effectiveness of TPS. Ogunleye (2019) revealed that TPS significantly improved Chemistry achievement, with extroverted students benefiting most. Chiakwelu and Okigbo (2020) found that TPS, jigsaw, and reciprocal teaching all enhanced mathematics achievement, with jigsaw yielding the highest gains. Macmillan and Shedow (2020) confirmed that TPS improved Physics achievement equally for male and female students. Collectively, these studies underscore the value of TPS in promoting active participation, collaboration, and achievement across science subjects.

Studies on varied-ability learners further demonstrate the importance of inclusive strategies. Huang and Zhu (2020) revealed that a higher proportion of low-ability students negatively affected peer performance, particularly among high achievers, though this effect was reduced in well-managed classrooms. Ramos et al. (2021) showed that teacher and peer support enhanced learning goal orientation among high- and average-ability students, predicting positive long-term outcomes. Anyifete (2024) found that the Science Process-Based Approach significantly improved science process skills across varied-ability groups, with high-ability students showing the greatest gains and no gender differences observed. These findings emphasize the need for instructional approaches that accommodate diverse ability levels to ensure equitable learning outcomes.

Although previous studies have established the effectiveness of the demonstration method (Sa'adu & Aliyu, 2017; Nnorom, 2017; Achimugu, 2018) and the TPS strategy (Ogunleye, 2019; Chiakwelu & Okigbo, 2020; Macmillan & Shedow, 2020) in improving students' performance, these approaches have largely been investigated independently rather than as an integrated approach. Similarly, studies on varied-ability learners (Huang & Zhu, 2020; Ramos et al., 2021; Anyifete, 2024) have focused on peer effects, motivation, and science process skills, but seldom on inclusive BST classrooms. Moreover, most existing studies were conducted in Chemistry, Biology, Physics, Mathematics, or general BST at the primary or senior secondary levels. Consequently, there is limited empirical evidence on the effect of a demonstration+TPS strategy on the academic performance of low, medium, and high ability Upper Basic students in Basic science. The present study seeks to fill this gap by investigating the effectiveness of demonstration+TPS strategy in promoting inclusive science learning among varied-ability learners.

To achieve the objectives of the study, the following research questions were raised:

1. What is the difference between the posttest academic performance scores of Upper Basic II students taught energy concepts using demonstration+TPS and those taught using the conventional method?
2. What is the difference between the posttest academic performance scores of high-, average-and low-ability Upper Basic II students taught energy concepts using demonstration+TPS?

The following null hypotheses were formulated and tested at $\alpha = .05$ level of significance:

1. There is no significant difference between the posttest academic performance scores of Upper Basic II students taught energy concepts using demonstration+TPS and those taught using conventional methods.
2. There is no significant difference between the posttest academic performance scores of high-, average-, and low-ability Upper Basic II students taught energy concepts using demonstration+TPS.

2 Theoretical Framework

Bruner's (1961) Constructivist Theory and Vygotsky's (1978) Social Constructivist Theory provide the theoretical foundation for the demonstration+TPS strategy. Bruner emphasizes that learners actively construct knowledge through guided discovery, arguing that instruction should present information in a way that allows students to explore, reorganize, and internalize concepts. His theory assumes that learning is most effective when learners are engaged in meaningful tasks that connect prior knowledge with new experiences. This makes the demonstration method effective because it allows students to observe scientific phenomena, explore their meaning, and independently apply concepts in problem-solving contexts. Vygotsky complements this view by stressing that learning occurs through social interaction and scaffolding within the Zone of Proximal Development (ZPD). His theory assumes that learners can achieve higher levels of understanding when supported by teachers or peers, gradually internalizing skills until they can perform independently. This assumption underpins the TPS strategy, which progresses from team collaboration to paired learning and finally to solo practice. The gradual release of responsibility reflects Vygotsky's belief that knowledge is co-constructed socially before becoming individualized.

Applications of these theories in science education literature are extensive. Bruner's constructivism has been applied in inquiry-based learning, discovery methods, and demonstration approaches that encourage students to link theory with practice. Vygotsky's social constructivism has informed cooperative learning models, peer tutoring, and scaffolding strategies that emphasize collaboration and shared meaning-making. Together, they support instructional approaches that combine teacher guidance with collaborative and independent learning, enhancing conceptual understanding, learner autonomy, and academic achievement in science classrooms. These applications lead directly to the argument for the demonstration+TPS strategy: by integrating Bruner's guided discovery with Vygotsky's scaffolding, learners benefit from both structured teacher input and peer-supported exploration, which is expected to improve performance across varied ability levels. Despite their influence, both theories face criticisms. Bruner's constructivism has been critiqued for being overly idealistic, assuming that all learners can engage in discovery learning without sufficient guidance, which may disadvantage low-ability students. Vygotsky's theory, while powerful, has been criticized for its heavy reliance on social interaction, which may not always be feasible in overcrowded classrooms or resource-limited contexts. Furthermore, cooperative learning strategies inspired by Vygotsky sometimes risk unequal participation, where stronger students dominate while weaker ones remain passive.

Nevertheless, the prospects of these theories remain strong. Bruner's emphasis on active knowledge construction continues to inspire modern inquiry-based and experiential learning approaches, while Vygotsky's ideas on scaffolding and social interaction underpin contemporary collaborative learning models and inclusive education practices. In the context of BST, integrating demonstration with TPS offers a practical way to balance teacher-led explanation with peer-supported learning, addressing criticisms by ensuring that learners of all ability levels receive both structured guidance and opportunities for active engagement. This theoretical foundation strengthens the rationale for hypothesizing that demonstration+TPS will significantly improve academic performance among Upper Basic II students, with differential benefits for low, medium, and high ability learners.

3 Methodology

3.1 Research Design

The study adopted a pretest–posttest non-randomized quasi-experimental design involving intact upper basic classes assigned to an experimental group and a control group. Both groups were taught energy concepts over six weeks, with the experimental group receiving instruction through a demonstration+TPS strategy and the control group taught using the conventional method. Pretest and posttest scores were used to determine the effect of the demonstration+TPS strategy on students' academic performance in BST.

3.2 Participants

The study targeted all upper basic II students in public junior secondary schools within the Zaria Education Zone of Kaduna State, Nigeria. The population consisted of 6,684 students (3,383 males and 3,301 females) drawn from 27 public junior secondary schools, comprising three boys' schools, three girls' schools, and twenty-one coeducational schools. From this population, a sample of 162 upper basic II students were selected using purposive and simple random sampling techniques. Coeducational schools were purposively chosen to ensure gender representation, after which two schools were randomly selected and assigned to the experimental and control groups. To classify students' ability levels, the Cognitive Abilities Test (Cog-AT) developed by Lohman and Hangen (2003) was administered, and students were categorized as low, medium, or high ability based on their scores. This classification facilitated meaningful comparison of the effects of the demonstration+TPS strategy on the academic performance of students across different ability levels.

3.3 Instruments

The instrument used for data collection in this study was the Energy Concept Performance Test (ECPT), developed by the researcher to assess upper basic II students' academic performance in energy concepts. The ECPT comprised 30 multiple-choice items drawn from three major energy topics, with each item constructed in line with the revised Bloom's Taxonomy to measure different cognitive levels. Each correct response was awarded one mark, giving a maximum obtainable score of 30. To ensure validity, the ECPT was subjected to expert review by a panel of Professors and Doctors from the Departments of Science Education and Physical Sciences at Ahmadu Bello University and the Federal University of Education (FUE), Zaria. The experts evaluated the adequacy of the test administration time, the relevance of the items to the study objectives, and the appropriateness of the language for the target participants. Their feedback guided revisions that enhanced the instrument's content validity and alignment with the study's goals.

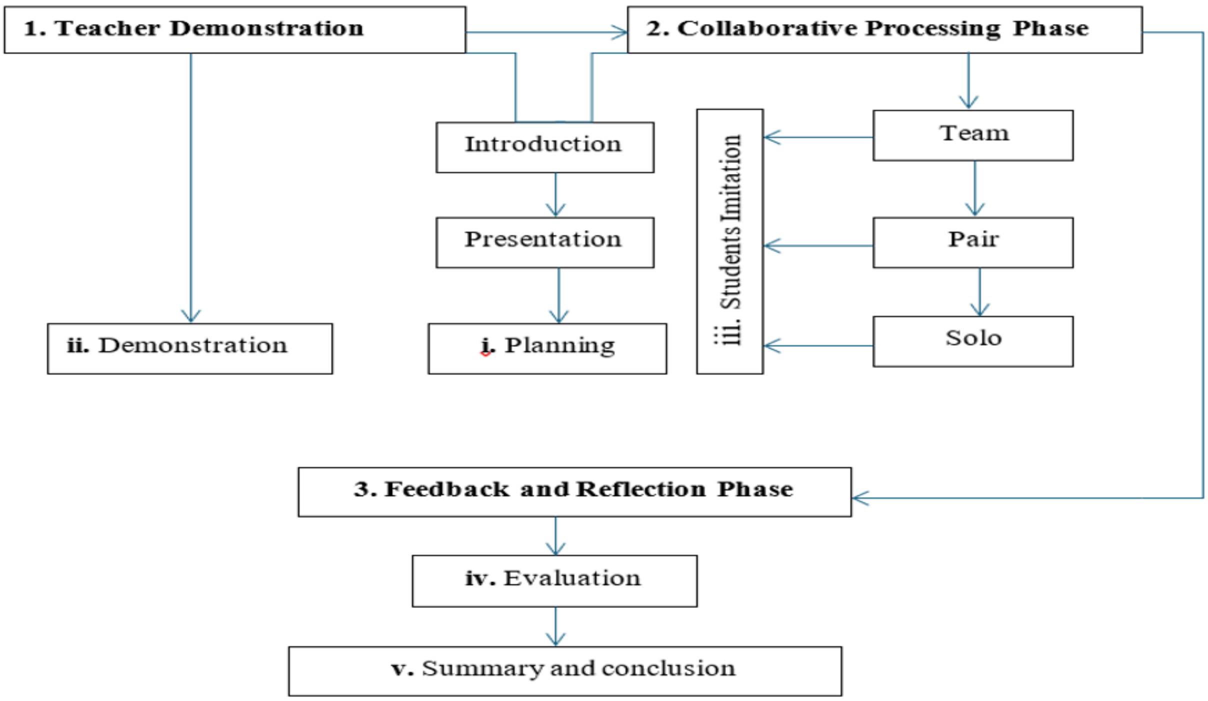
In the same vein, item analysis was conducted to determine the difficulty and discrimination indices of the test items. The analysis revealed that some items were too easy while some's were too difficult, while others had unsatisfactory discrimination indices. Items that did not meet the established criteria were discarded, and only items with acceptable difficulty and discrimination indices were retained for the final test. Reliability of the ECPT was established through pilot testing. The data obtained were analyzed using Pearson Product Moment Correlation (PPMC). The reliability coefficient obtained was 0.756, indicating that the instrument was sufficiently reliable for measuring students' academic performance in energy concepts.

3.4 Procedure for Data Collection and Analysis

The treatment lasted six weeks, during which the experimental group was taught using the demonstration+TPS strategy**,** while the control group were taught through the conventional method. Students were first classified into high-, medium-, and low-ability, after which pretests were administered to establish baseline measures. The intervention covered three energy topics and was implemented by the researcher. Figure 1 shows the flow of the lesson using demonstration+TPS strategy.

Figure **1**

Flow of demonstration+TPS strategy



3.4.1 Teacher Demonstration Phase:

The teacher introduced the topic, defined learning goals, and demonstrated each process or experiment step-by-step using appropriate instructional materials while engaging students through guiding questions.

3.4.2 Collaborative Processing Phase:

Students replicated the demonstrated activities in three sequential stages -Team, Pair, and Solo.

i. **In the Team stage**, students worked in heterogeneous groups (4-5 members) to discuss, observe, and perform the task collectively.

ii. **In the Pair stage,** they worked in dyads to repeat the activity and solve assigned problems with reduced support.

iii. **In the Solo stage**, each student independently performed the task, demonstrating personal mastery of the concept.

3.4.3 Feedback and Reflection Phase:

The teacher provided feedback, clarified misconceptions, and guided students to reflect on what they learned. Classwork and homework were given to reinforce understanding.

At the end of the treatment, a post-test was administered to both groups to assess the effect of the treatment on students' performance. Statistical Package for Social Sciences (SPSS) IBM version 26.0 was used to analyze the data collected. Charts, mean and standard deviation were used in answering the research questions. The following null hypotheses were analyzed using Quade's ANCOVA at $\alpha = 0.05$ level of significance.

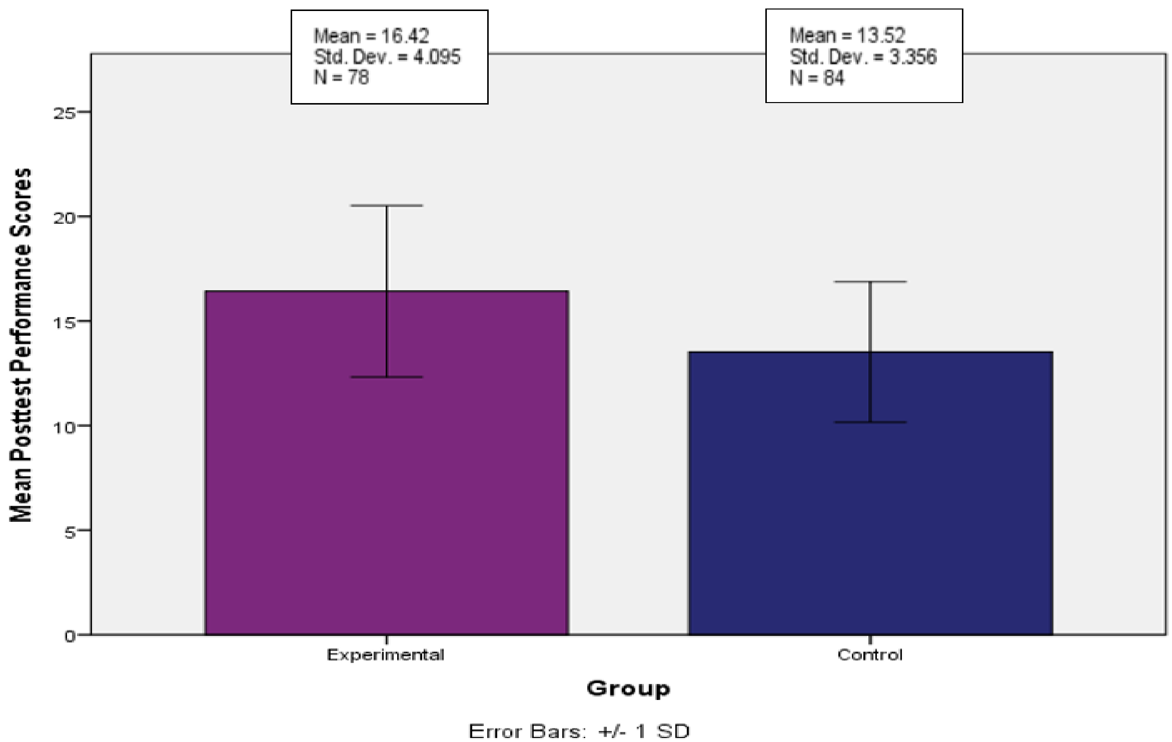
4 Results

4.1 Addressing Research Question One

To answer the research question 1, the data generated via ECPT were subjected to descriptive statistics of mean and standard deviation and the summary of the result is presented in Figure 2.

Figure **2**

Summary of descriptive statistics of post-test performance scores



The descriptive statistics in Figure 2 showed that the experimental group (n = 78) obtained a higher mean academic performance score **(**M = 16.42, SD = 4.10**)** than the control group (n = 84; M = 13.52, SD = 3.36**)**, resulting in a mean difference of 2.90. Although both groups exhibited moderate variability in scores, the experimental group showed slightly greater variation. In order to examine whether the mean difference is significant, we tested the corresponding null hypothesis.

4.2 Testing null hypothesis one

Prior to testing hypothesis, we explored the posttest datasets for normality assumptions since other parametric assumptions like independent samples and continuous level of measurement are essentially satisfied. Table 1 presents the statistics for the normality test.

Table **1**

Tests of normality for posttest datasets

	Group	**Kolmogorov-Smirnov[a]**			**Shapiro-Wilk**		
		Statistic	**Df**	**p-value**	**Statistic**	**Df**	**p-value**
Posttest Performance Scores	Experimental	.169	78	<.001	.939	78	.001
	Control	.182	84	<.001	.825	84	<.001

a. Lilliefors Significance Correction

For the post-test performance scores, Table 1 shows that both the Kolmogorov–Smirnov and Shapiro–Wilk tests were statistically significant ($p < .05$), suggesting a deviation from normality. Therefore, the assumption of normality was considered violated. As such, non-parametric tests are used for testing hypotheses 1 and 2

To test the null Hypothesis 1, the data generated via ECPT were subjected to Quade's ANCOVA and the summary of the result is presented in Table 2

Table **1**

Summary statistics of Quade's ANCOVA using transformed pretest and posttest performance scores

Source of Variation	**Sum of Squares (Ranks)**	**df**	**Mean Square (Ranks)**	**Quade's F**	**p-value**
Group	44347.96	1	44347.96	28.21	<.001
Error (Ranks)	251546.4	160	1572.165		
Total (Ranks)	295894.32	161			

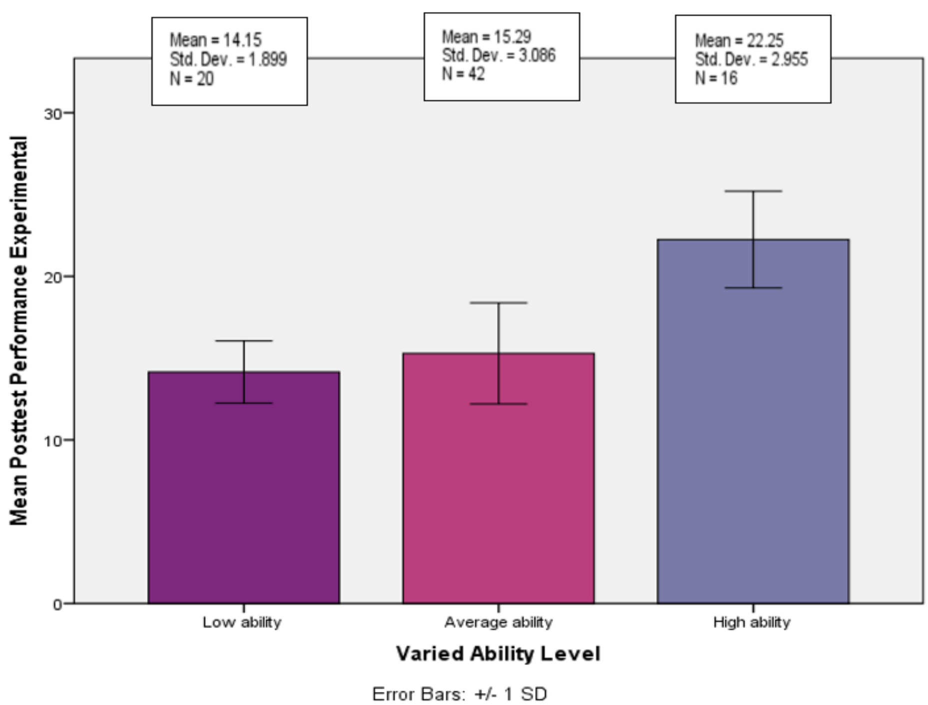
The Quade's ANCOVA results in Table 2 revealed a statistically significant difference in posttest performance between students taught using the demonstration+TPS strategy and those taught using the conventional method**,** Quade's $F(1, 160)= 28.21$, $p < .001$. Consequently, the null hypothesis was rejected, confirming that the demonstration+TPS strategy significantly improved the academic performance of upper basic students in energy concepts compared to the conventional method.

4.3 Addressing Research Question Two

To answer the research question 2, the data generated via ECPT were subjected to descriptive statistics of mean and standard deviation and the summary of the result is presented in Figure 3.

Figure **3**

Summary of descriptive statistics of post-test performance scores across varied ability levels



The descriptive statistics for the experimental group (n = 78**)** showed that 20 students were low-ability, 42 were average-ability, and 16 were high-ability. Mean academic performance increased across the ability levels, with low-ability students scoring 14.15 (SD = 1.90), average-ability students 15.29 (SD = 3.09), and high-ability students 22.25 (SD = 2.96)**.** These results indicate a clear positive effect between ability level and academic performance, with high-ability students achieving the highest performance scores. In order to examine whether the mean difference is significant, we tested the corresponding null hypothesis.

4.4 Testing Null Hypothesis Two

To test the null hypothesis 2, the data generated via ECPT were subjected to Quade's ANCOVA and the summary of the result is presented on Table 3

Table **3**

Summary statistics of Quade's ANCOVA using transformed pretest and posttest performance scores across ability levels

Source of Variation	**Sum of Squares (Ranks)**	**Df**	**Mean Square (Ranks)**	**Quade's F**	**p-value**
Varied Ability	14219.464	2	7109.732	22.89	<.001
Error (Ranks)	23299.370	75	310.658		
Total (Ranks)	37518.834	77			

a. R Squared = .379 (Adjusted R Squared = .362)

The results on Table 3 revealed that ability level had a statistically significant effect on students' posttest academic performance, Quades's $F(2, 75) = 22.886$, $p < .001$. Consequently, the null hypothesis was rejected, confirming significant differences in academic performance among low, average, and high ability students following the instructional intervention. Furthermore, The Scheffe's post hoc comparison test was conducted to determine which ability groups differed significantly in their post-test academic performance score as presented in Table 4

Tabl**e 4**

Scheffe's post hoc comparison test of performance across ability levels

(I) Varied Ability Level	**(J) Varied Ability Level**	**Mean Difference (I-J)**	**Std. Error**	**p-value**	**95% Confidence Interval**	
					Lower Bound	**Upper Bound**
Low ability	Average ability	-6.895	4.78847977	.360	-18.854	5.064
	High ability	-37.342*	5.91177255	<.001	-52.107	-22.578
Average ability	Low ability	6.895	4.78847977	.360	-5.064	18.854
	High ability	-30.447*	5.17810456	<.001	-43.379	-17.515
High ability	Low ability	37.342*	5.91177255	<.001	22.578	52.107
	Average ability	30.447*	5.17810456	<.001	17.515	43.379

Based on observed means.

The error term is Mean Square (Error) = 310.658.

*. The mean difference is significant at the .05 level.

The Scheffé post hoc test revealed no significant difference in posttest academic performance between low- and average-ability students (MD = -6.895, p = .360). However, high-ability students performed significantly better than both low-ability students (MD = -37.342, p < .001) and average-ability students (MD = -30.447, p < .001). These findings indicate that while the demonstration+TPS strategy produced comparable outcomes for low and average ability learners, high ability students achieved significantly superior academic performance.

5 Discussion

The findings revealed that the demonstration+TPS strategy significantly improved the academic performance of upper basic students compared with the conventional teaching method and was effective across different ability levels. The demonstration+TPS approach enhanced students' understanding of energy concepts by combining teacher-led demonstration with collaborative and independent learning, consistent with Vygotsky's scaffolding theory and Bruner's constructivist principles. While high-ability students achieved significantly higher performance than their low- and average-ability counterparts, low- and average-ability students performed similarly, indicating that the demonstration+TPS strategy provided sufficient support for both groups. These results align with earlier studies on demonstration-based instruction. Sa'adu and Aliyu (2017) found that activity-based and demonstration methods significantly improved BST performance compared to conventional teaching, while Achimugu (2018) reported that enriched demonstration strategies produced higher achievement in Chemistry. Similarly, Nnorom (2017) observed that learner-centered approaches such as demonstration enhanced science process skills more effectively than traditional methods. The present study confirms that demonstration remains a powerful instructional tool, particularly when enriched with cooperative learning elements.

Parallel evidence from cooperative learning research also supports these findings. Ogunleye (2019) showed that TPS significantly improved Chemistry achievement, with extroverted students benefiting most, while Chiakwelu and Okigbo (2020) demonstrated that TPS, jigsaw, and reciprocal teaching all enhanced mathematics achievement compared to conventional methods. Macmillan and Shedow (2020) further confirmed that TPS improved Physics achievement equally for male and female students. The present study extends these findings by showing that TPS, when integrated with demonstration, not only improves performance but also accommodates varied-ability learners in inclusive BST classrooms. The results also resonate with studies on varied-ability learners. Huang and Zhu (2020) highlighted the negative peer effects of low-ability students in poorly managed classrooms, while Ramos et al. (2021) emphasized the importance of teacher and peer support in sustaining motivation among high- and average-ability learners. Anyifete (2024) found that science process-based approaches improved skills across ability groups, with high-ability students showing the greatest gains. Consistent with these findings, the present study revealed that high-ability students achieved significantly higher performance, but low- and average-ability students also benefited from the structured support of demonstration+TPS, reducing achievement gaps in inclusive classrooms.

Taken together, these findings provide empirical support for the following discussion points: There is a significant difference in the academic performance of students taught energy concepts through the enriched demonstration+TPS strategy compared to those taught using the conventional method. The observed contrast indicates a favorable outcome for the experimental group, consistent with prior evidence that learner-centered and enriched instructional approaches outperform traditional lecture-based methods. Similarly, there is a significant difference in the academic performance of high-ability students taught energy concepts through the demonstration+TPS strategy compared to low- and average-ability students. This outcome reflects the tendency for high-ability learners to achieve greater gains, as reported in earlier studies, but also demonstrates that the strategy provides adequate scaffolding and peer support to sustain learning among low- and average-ability groups.

6 Contribution

The study established that demonstration +TPS strategy significantly enhances students' academic performance in energy concepts compared to conventional teaching methods. This shows that integrating teacher-led demonstration with collaborative and independent learning provides a more effective instructional approach for science education.

It further establishes that high-ability students benefit more in terms of academic performance, while low- and average-ability students benefit equally, indicating that the strategy not only supports stronger learners but also provides adequate scaffolding and peer support for weaker ones. This highlights the potential of demonstration+TPS to promote inclusive learning by reducing achievement gaps across varied ability levels.

7 Limitations and Implication of Findings

First, the study was conducted within a single education zone (Zaria, Kaduna State) and involved only two coeducational schools, which may limit the generalizability of the findings to other regions or school types. Second, the sample size of

162 students, though adequate for experimental design, represents only a fraction of the larger population of upper basic II students. Third, the study focused specifically on energy concepts within BST, meaning the effectiveness of demonstration+TPS across other science topics remains to be tested. Additionally, the classification of students into low, medium, and high ability groups was based on a single standardized test (Cog-AT), which may not fully capture the multidimensional nature of learners' abilities. Finally, the quasi-experimental design, while robust, cannot entirely eliminate external influences such as teacher differences, classroom environment, or students' prior exposure to cooperative learning.

Despite these limitations, the findings carry important implications. Theoretically, the study reinforces Bruner's constructivist theory and Vygotsky's social constructivist framework by demonstrating that combining guided discovery with scaffolding and collaborative learning enhances conceptual understanding and performance. It contributes to knowledge by showing that demonstration+TPS is not only effective in improving academic achievement but also inclusive, providing equitable support for low- and average-ability learners while maximizing gains for high achievers. This expands the literature on instructional strategies by offering empirical evidence for the integration of demonstration and cooperative learning in BST classrooms. Practically, the findings suggest that teachers should adopt demonstration+TPS as a strategy for teaching complex science concepts such as energy. By blending teacher-led explanation with peer collaboration and independent practice, educators can foster deeper understanding, reduce achievement gaps, and promote inclusive learning. Curriculum planners and policymakers should consider embedding cooperative demonstration strategies into teacher training programs and instructional guidelines for junior secondary schools. Schools should also provide adequate resources and classroom management support to ensure effective implementation.

8 Declarations

Conflict of Interest: *The author*s declare neither financial nor non-financial conflict of interest.

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Data Availability Statement: The dataset used for this study is available from the corresponding author.

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