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Effect of Team-Based Instructional Strategy on English Reading Comprehension Achievement of Upper Basic II Students in Kogi East Senatorial Zone, Nigeria

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Abstract

Upper Basic II students in Kogi East Senatorial Zone, Nigeria, consistently perform poorly in English reading comprehension, partly because instruction remains teacher centred. This study examined the effect of the Team-Based Instructional Strategy (TBIS) on students' English reading comprehension achievement and whether achievement differed by gender. Two research questions and two null hypotheses guided the study, with Social Learning Theory as framework. A quantitative, non-equivalent control group pre-test post-test quasi-experimental design was adopted. From a population of 11,517 Upper Basic II students, multi-stage sampling yielded 105 students (43 male, 62 female) in four intact classes from four schools (two public, two private); 55 received TBIS and 50 the conventional lecture method for six weeks. Data were collected with the Reading Comprehension in English Achievement Test (RCEAT), a 30 item multiple choice test validated by three experts, with a Kuder-Richardson 20 reliability of 0.88. Research questions were answered with means and standard deviations; hypotheses were tested with analysis of covariance (ANCOVA) at the 0.05 level, with pre-test scores as covariate. The TBIS group recorded a higher mean gain (28.0) than the lecture group (20.2), and the difference in adjusted post-test achievement was statistically significant ($F(1, 102) = __$, $p = __$, partial $\eta^2 = __$). Male and female students did not differ significantly ($F(1, 103) = 0.871$, $p = .352$, partial $\eta^2 = .006$). TBIS therefore improved reading comprehension achievement irrespective of gender. Teachers in Kogi East should adopt TBIS, and Kogi SUBEB should include it in teacher professional development.

Keywords: team-based instructional strategy; reading comprehension; academic achievement; quasi-experiment; Upper Basic II.

INTRODUCTION

Reading comprehension in English serves as the foundation for academic success across all subjects, as it enables students to interact meaningfully with texts, extract relevant information, and develop critical thinking skills (Elleman & Oslund, 2019). Globally, however, reading comprehension instruction remains a cause for concern. International assessments continue to show that large proportions of adolescents cannot read with understanding, and classroom studies report that many teachers of English as a second or additional language still rely on questioning and summarising rather than on strategies that engage learners in meaning making (Olifant et al., 2022; Sibanda et al., 2024). Learners in Grade 8, the equivalent of Upper Basic II, have been found to struggle particularly with inferential and evaluative comprehension because of limited vocabulary, low motivation and teacher centred instruction (Molwantoa & Olifant, 2025; Olifant et al., 2019). In the Nigerian context, where English serves as the language of instruction from upper basic levels onward, proficiency in reading comprehension is even more crucial. Many students enter junior secondary school with weak foundational reading skills, which hinders their ability to engage

with increasingly complex academic texts. These challenges are further compounded by factors such as overcrowded classrooms, lack of individualized support, and insufficient access to diverse reading materials (Ebibi et al., 2026). As a result, students often rely heavily on rote memorization rather than developing deep comprehension skills, ultimately affecting their performance not only in English but also in subjects that require interpretation and application of knowledge .

Moreover, reading comprehension at this level involves more than just literal understanding; it requires higher-order thinking skills such as analysis, synthesis, and evaluation (Oguntade, 2021). Students must be able to interpret figurative language, recognize the author's purpose and tone, and connect ideas within and across texts. These skills are vital for academic tasks such as summarizing passages, answering inferential questions, and engaging in classroom discussions. Furthermore, competence in reading comprehension empowers students to become independent learners capable of exploring new concepts on their own (Elleman & Oslund, 2019). Therefore, prioritizing the development of strong reading comprehension skills during the upper basic level is essential for laying a solid foundation for lifelong learning and academic achievement in all subject areas.

Reading comprehension refers to the ability to process, interpret, and understand the meaning of written text. It involves not only decoding words but also integrating prior knowledge, making inferences, and critically evaluating content to form a coherent mental representation (Elleman & Oslund, 2019). Several factors affect reading comprehension performance, including instructional strategy, learner background knowledge, motivation, and the linguistic complexity of texts (Yusuf, 2016). Poor instructional methods, in particular, fail to scaffold learning effectively or stimulate student interest, leading to low engagement and poor comprehension (Cekiso, 2017; Olifant et al., 2020). Therefore, improving reading comprehension requires adopting student-centered instructional strategies that accommodate individual differences, build vocabulary, and promote active learning. One such method is the Team-Based Instructional Strategy (TBIS), a structured form of cooperative learning in which permanent, heterogeneous teams of students prepare individually, demonstrate their readiness through individual and team tests, and then apply what they have read to solve comprehension problems together (Burgess et al., 2020; Gillies, 2016).

Reading comprehension in English is a fundamental skill required for academic success, yet many students in Upper Basic II, specifically in Kogi East Senatorial Zone, struggle to master it. Despite being exposed to English instruction from early years, a significant number of these students are unable to read fluently, interpret texts correctly, or extract essential information from reading passages. This has led to consistently poor performance in English Language, particularly in reading comprehension sections of standardized tests like the WASSCE, NECO, and internal examinations (West African Examinations Council, 2023). The chief examiners' reports of the West African Examinations Council repeatedly identify candidates' inability to make inferences, to distinguish main ideas from supporting details and to explain figurative expressions as the main weaknesses in the comprehension paper (West African Examinations Council, 2023), and a content analysis of the examination shows that inferential and evaluative questions,

the levels at which students are weakest, carry substantial weight (Oguntade, 2021). Because the Basic Education Certificate Examination (BECE) and the senior secondary examinations build on the comprehension foundation laid at Upper Basic level, the problem is urgent: students who leave Upper Basic II without adequate comprehension skills carry the deficit into every subject they study subsequently. One major issue contributing to poor reading comprehension is the continued use of traditional teaching methods that focus on rote memorization and teacher-centered instruction. These methods do not adequately address the individual needs of students or encourage active participation in reading activities, and they offer few opportunities for students to observe, imitate and practise effective reading behaviours modelled by peers.

Empirical evidence on team based and cooperative strategies supports their use for reading instruction. In a meta-analysis of 17 studies, Swanson et al. (2019) found that team-based learning produced a moderate positive effect on content knowledge (Hedges' $g = 0.55$) compared with lecture based instruction, with effects that were strongest when the full sequence of individual preparation, readiness assurance tests and team application tasks was implemented. Liu and Beaujean (2017), in an earlier meta-analysis of 31 effect sizes, reported a smaller but still positive mean effect ($d = 0.33$), which they attributed to variation in how faithfully the method was implemented. Closer to the present context, Ugwu (2019) used a pre-test post-test quasi-experimental design with 78 senior secondary students in three intact classes in Benue State, Nigeria, and found that the student teams-achievement divisions strategy had a significant main effect on students' interest in reading comprehension ($F(1, 51) = 3.743$, $p < .05$) when analysed with ANCOVA. Similarly, Ebibi et al. (2026) compared a cooperative method with the conventional method among 93 Junior Secondary II students in two intact classes in Jos North, Plateau State, using a non-equivalent control group design and ANCOVA, and reported that the cooperative method significantly enhanced achievement in reading comprehension. On gender, Owodunni (2018) examined 210 Junior Secondary II students in the Federal Capital Territory and found that an extensive reading strategy improved achievement, that boys scored higher than girls, but that there was no interaction between strategy and gender, whereas Reilly et al. (2019) documented a persistent advantage for girls in reading achievement across three decades of United States national assessment data. Evidence on whether gender moderates the benefit of team based instruction in reading is therefore mixed.

Despite this growing literature, three gaps are evident. First, most team-based learning studies have been conducted in tertiary and health professions contexts (Burgess et al., 2020; Swanson et al., 2019); studies at the junior secondary level in Nigeria have examined cooperative learning in general rather than the specific team-based sequence of individual readiness assurance, team readiness assurance and application exercises. Second, no published study, to the knowledge of the researchers, has tested the Team-Based Instructional Strategy on English reading comprehension among Upper Basic II students in Kogi East Senatorial Zone, an area characterised by large classes, scarce reading materials and persistent poor results in English. Third, the Nigerian studies reviewed above did not control for pre-test differences with a covariate while also examining gender, so it remains unclear whether the strategy benefits boys and girls equally once initial ability is held constant. The novelty of the present study lies in implementing the full team-based sequence

with Upper Basic II students in Kogi East, in a non-equivalent control group pre-test post-test design, and in testing both the treatment effect and the gender difference with ANCOVA.

The purpose of this study was therefore to (1) determine the difference between the mean achievement scores of Upper Basic II students taught reading comprehension in English with the Team-Based Instructional Strategy and those taught with the conventional lecture method, and (2) determine the difference between the mean achievement scores of male and female students taught reading comprehension in English. The findings will benefit teachers of English, who will gain a replicable procedure for organising reading lessons in large classes; curriculum planners and the Nigerian Educational Research and Development Council, who may consider embedding team based procedures in the Upper Basic English Studies curriculum; the Kogi State Universal Basic Education Board (SUBEB) and the Teaching Service Commission, who are responsible for teacher professional development; students, who stand to gain more active and equitable reading lessons; and future researchers, for whom the study provides baseline data from Kogi East. Theoretically, the study tests whether the observational and vicarious learning mechanisms proposed by Social Learning Theory operate in reading comprehension classrooms; practically, it indicates whether a low cost strategy that requires no additional materials can raise comprehension achievement for both genders.

Instructional strategies such as TBIS improve learning outcomes by engaging students in meaningful, collaborative experiences that cater to diverse learning styles and bridge understanding gaps (Gillies, 2016). Considering gender is also crucial, as it influences students' academic experiences and outcomes (Reilly et al., 2019). Gender differences often shape student engagement and achievement levels. For example, girls may perform better in language-related tasks due to higher verbal engagement, while boys may struggle because of lower motivation or reading anxiety (Reilly et al., 2019), although Nigerian evidence has sometimes favoured boys (Owodunni, 2018). Understanding how both genders respond to TBIS can help promote equity in achievement .

The study is anchored on Social Learning Theory, which holds that learning occurs through attention to, retention of, reproduction of and motivation to imitate behaviours modelled by others (Rumjaun & Narod, 2020). The team based sequence gives every student repeated opportunities to observe peers model reading behaviours, to rehearse those behaviours in team discussion and to be reinforced vicariously through team success, which is why the theory was judged appropriate for explaining the expected effect of TBIS. The theory is elaborated in the literature review and is used again in the discussion to interpret the findings.

The following research questions and hypotheses guided the study:

1. What is the difference between the mean achievement scores of students taught reading comprehension in English with the team-based instructional strategy and those taught with the conventional lecture method?
2. What is the difference between the mean achievement scores of male and female students taught reading comprehension in English?

The following null hypotheses were tested at the 0.05 level of significance:

H_{o1}: There is no significant difference between the achievement mean scores of students taught reading comprehension in English with the team-based instructional strategy and those taught using the conventional lecture method.

H_{o2}: There is no significant difference between the achievement mean scores of male and female students taught reading comprehension in English.

LITERATURE REVIEW

Team-based Instructional Strategy

The Team-Based Instructional Strategy (TBIS) used in this study is the classroom application of team-based learning, a structured form of cooperative learning in which students work in permanent, heterogeneous teams of five to seven members through a fixed sequence of activities: individual preparation on an assigned text, an individual readiness assurance test, the same test taken again by the team until consensus is reached, immediate feedback and clarification by the teacher, and team application exercises in which all teams work on the same significant problem, make a specific choice and report simultaneously (Burgess et al., 2020). Unlike loosely organised group work, TBIS holds each student individually accountable before the team works together, and it holds the team accountable for a shared answer, so that free riding is discouraged and every member is drawn into discussion (Gillies, 2016). Applied to reading comprehension, the assigned text is a passage, the readiness tests are comprehension questions at the literal and inferential levels, and the application exercises require teams to defend an interpretation, identify the author's purpose or evaluate a claim in the passage. In this way the strategy integrates reading with speaking and listening, and it exploits the incidental learning that arises from peer interaction (Ojochegbe et al., 2025).

Research syntheses consistently report that team-based learning raises achievement relative to lecture based instruction, although the size of the benefit varies. Swanson et al. (2019) found a moderate average effect on content knowledge across 17 studies, and Liu and Beaujean (2017) found a small to moderate effect across 31 effect sizes, with fidelity of implementation explaining much of the variation. Burgess et al. (2020) note that the strategy is especially suited to large classes with a single facilitator, because the readiness tests and application exercises keep every team working simultaneously. Cooperative structures of this kind have also been shown to improve learners' interest in and achievement in reading comprehension in Nigerian secondary classrooms (Ebibi et al., 2026; Ugwu, 2019). Reading researchers add that explicit, strategy focused comprehension instruction is effective for second language learners and that teachers who receive training in such strategies are more likely to use them (Boakye, 2021; Elston et al., 2022; Tiba, 2023); TBIS provides a structure within which such strategies can be modelled by the teacher and rehearsed by peers. The strategy also suits under-resourced schools, since it requires no materials beyond the reading passage and the question sets, and it can be implemented where textbooks are scarce by providing one copy of the passage per team.

Social Learning Theory (SLT)

Social Learning Theory (SLT) was propounded by Albert Bandura in 1977 (Bandura, 1977, as cited in (Rumjaun & Narod, 2020)). The theory asserts that learning occurs within

a social context and emphasizes the importance of observing, modeling, and imitating the behaviors, attitudes, and emotional reactions of others. Unlike purely behaviorist approaches that focus solely on direct reinforcement, SLT highlights the role of vicarious reinforcement and cognitive processes. Bandura posited that individuals learn not only through their own experiences but also by watching others, a process known as observational learning. This principle is especially important in classrooms where peer interactions and teacher modeling play a central role. One of the key strengths of SLT lies in its recognition of the active role of cognitive processes in learning. Bandura argued that attention, retention, reproduction, and motivation are essential components of observational learning (Rumjaun & Narod, 2020).

In the context of this study, SLT is particularly relevant as it helps explain how TBIS can improve reading comprehension achievement. Each of the four processes maps onto a stage of the TBIS sequence. Attention is secured because every student must read the passage before the individual readiness test, and the subsequent team test makes it visible to peers whether a member has attended to the text. Retention is strengthened during the team readiness test, in which members verbalise and rehearse the reasoning behind each answer, so that successful comprehension strategies such as locating textual evidence or inferring word meaning from context are observed and encoded. Reproduction occurs in the application exercise, where students must enact the strategies they have observed on new questions. Motivation is supplied vicariously: when a team's consensus answer is confirmed, every member experiences the reinforcement of the model's success, and peer approval within the team sustains effort. Because the models in each team are peers of both genders and of mixed ability, the theory predicts that boys and girls are exposed to the same modelled behaviours and should benefit comparably; this prediction is examined in the second hypothesis and revisited in the discussion.

RESEARCH METHODS

Research Type and Design

This study is quantitative and employed a quasi-experimental design, specifically the non-equivalent control group pre-test post-test design (Creswell & Creswell, 2018). Intact classes were used because the school timetable and class structure in Kogi East do not permit the random assignment of individual students to conditions without disrupting teaching; the design therefore compares pre-existing groups and uses the pre-test as a covariate to adjust for initial differences between them. The independent variable was the instructional strategy at two levels (TBIS and conventional lecture method), the moderator variable was gender, and the dependent variable was achievement in reading comprehension in English measured by post-test scores.

Area of the Study

The study was conducted in Kogi East Senatorial Zone, one of the three senatorial zones of Kogi State, Nigeria. The zone comprises nine Local Government Areas (Ankpa, Bassa, Dekina, Ibaji, Idah, Igalamela-Odolu, Ofu, Olamaboro and Omala). It is predominantly Igala speaking, and English is used as the medium of instruction from Upper Basic level. The sampling frame consisted of all public and private junior secondary schools

in the zone that offered Upper Basic II English Studies in the 2024/2025 academic session, as listed by the Kogi State Teaching Service Commission and the Ministry of Education.

Population and Sample

The population of the study consisted of all 11,517 Upper Basic II students in the public and private junior secondary schools of Kogi East Senatorial Zone. A multi-stage sampling procedure was used. In the first stage, two Local Government Areas were selected from the nine by simple random sampling (balloting without replacement). In the second stage, one public and one private co-educational junior secondary school were selected purposively from each of the two Local Government Areas, the criteria being that the school had at least one intact Upper Basic II class, a qualified English Studies teacher and a timetable that permitted the six week treatment; this gave four schools (two public and two private). In the third stage, one intact Upper Basic II class was selected from each school by balloting, and the two schools in one Local Government Area were assigned by balloting to the experimental condition while the two schools in the other Local Government Area formed the control condition, so that experimental and control students did not attend the same school. Although 305 students in ten schools had initially been identified at the second stage, six schools were excluded because they could not accommodate the treatment schedule, and the final analytical sample comprised the 105 students (43 male, 62 female) in the four intact classes who sat both the pre-test and the post-test: 55 students (two classes) in the experimental group and 50 students (two classes) in the control group. No student who completed the pre-test was lost at post-test. This sample size is used consistently in all tables.

Instrument

Data were collected with the Reading Comprehension in English Achievement Test (RCEAT), a researcher developed instrument consisting of 30 multiple choice items with four options each, built on three comprehension passages (narrative, expository and argumentative) drawn from the Upper Basic II English Studies curriculum. Each correct answer attracted one mark, and the raw score out of 30 was converted to a percentage (raw score ÷ 30 × 100), so that all means reported in this study are percentage scores. The items were distributed across three levels of comprehension, as shown in the table of specification (Table 1).

Table 1. Table of Specification for the Reading Comprehension in English Achievement Test (RCEAT)

Passage	Literal (Remember/Understand)	Inferential (Apply/Analyse)	Evaluative (Evaluate/Create)	Total
Passage 1 (narrative)	4	4	2	10
Passage 2 (expository)	4	4	2	10
Passage 3 (argumentative)	4	4	2	10
Total	12	12	6	30

Note. Bloom's revised taxonomy levels are shown in parentheses

Face and content validity of the RCEAT were established by three experts: two lecturers in English Language Education and one in Measurement and Evaluation, all of the

Faculty of Education, Prince Abubakar Audu University, Anyigba. They examined the passages for suitability to Upper Basic II level, the match between items and the table of specification, and the clarity of stems and options. On their advice, four items with two defensible answers were replaced, six stems were reworded for clarity, and the argumentative passage was shortened. The revised instrument was trial tested on 40 Upper Basic II students in a school in Kogi Central Senatorial Zone, which is outside the study area, so that no sampled student was exposed to the items before the pre-test. The reliability coefficient from the trial test, estimated with the Kuder-Richardson 20 formula, was 0.88. The same 30 items were used at pre-test and post-test, but the order of items and options was reshuffled at post-test to reduce memory effects.

Treatment Procedure

The experiment proceeded in four stages: training of research assistants, pre-test, treatment and post-test. The treatment lasted six weeks, with two 40 minute English Studies periods per week, giving 12 lessons in each condition. Six reading passages taken from the recommended Upper Basic II English Studies textbook, two each of the narrative, expository and argumentative types, were used in both conditions in the same order, with one passage covered in two consecutive lessons. In the experimental classes, students were placed in permanent teams of five to six members, formed by the teacher so that each team was heterogeneous in pre-test score and included both boys and girls. Each TBIS lesson followed the sequence summarised in Table 2: individual silent reading of the passage (8 minutes); an individual readiness assurance test of five multiple choice questions on the literal and inferential content of the passage (5 minutes); the team readiness assurance test, in which the team discussed and agreed on a single answer to the same five questions (7 minutes); teacher feedback and clarification of items most teams missed, including explicit modelling of the strategy needed, such as finding textual evidence or inferring meaning from context (7 minutes); a team application exercise in which all teams worked on the same inferential or evaluative problem drawn from the passage, selected one answer from given options and reported their choice simultaneously by raising answer cards, followed by whole class justification of the choices (10 minutes); and a brief debrief (3 minutes). Team scores from the readiness tests were displayed on the board each week to provide vicarious reinforcement.

Table 2. Lesson Sequence in the Experimental (TBIS) and Control (Lecture) Conditions

Stage	Experimental group (TBIS)	Control group (conventional lecture method)
Introduction (2 min)	Teacher states the passage topic and lesson objective	Teacher states the passage topic and lesson objective
Reading (8 min)	Individual silent reading of the passage	Teacher reads the passage aloud and explains difficult words
Readiness (12 min)	Individual readiness test (5 items), then team readiness test on the same items with team consensus	Teacher explains the passage paragraph by paragraph; students listen and take notes
Feedback (7 min)	Teacher clarifies items missed by teams and models the comprehension strategy required	Teacher asks oral questions; individual students answer

Stage	Experimental group (TBIS)	Control group (conventional lecture method)
Application (10 min)	Teams solve one inferential or evaluative problem, choose an answer and report simultaneously; class justifies choices	Students answer written comprehension questions individually; teacher marks
Closure (1 min)	Team scores recorded; passage for the next lesson announced	Teacher summarises the passage

The control classes were taught the same passages for the same number of periods with the conventional lecture method, in which the teacher read and explained the passage, asked oral questions and had students answer written comprehension questions individually. Lesson plans for the 12 lessons in each condition were prepared by the researchers, validated by the same three experts who validated the RCEAT, and are provided as supplementary material (Appendices A and B), available from the corresponding author. The pre-test was administered in the week before the treatment and the post-test in the week after it, in both conditions.

Research Assistants and Treatment Fidelity

The four regular English Studies teachers of the sampled classes served as research assistants, so that students were taught by a familiar teacher in both conditions. The two experimental teachers received two days of training (six hours in total) conducted by the researchers, covering the rationale of TBIS, team formation, the readiness assurance process, the application exercise and the use of the lesson plans, and each delivered a demonstration lesson that was critiqued before the treatment began; training of this kind has been shown to increase teachers' willingness and ability to use comprehension strategies (Tiba, 2023). The two control teachers were briefed on the lecture lesson plans and the timetable. To ensure fidelity, the researchers observed each class at least twice a week using a checklist of the stages in Table 2 and gave corrective feedback where a stage was omitted or shortened.

Control of Extraneous Variables

Teacher variability was minimised by using the regular class teachers in both conditions, standardised lesson plans and the same passages, and by the training and observation described above. The Hawthorne effect was reduced by presenting the lessons in both conditions as part of normal English Studies instruction, by administering the same tests to both groups and by not informing students which group was the experimental one. Inter-group contamination was avoided by locating the experimental and control classes in different schools and different Local Government Areas. Pre-test sensitisation was addressed by the six week interval between tests and the reshuffling of items at post-test, and initial differences between the intact groups were controlled statistically by using pre-test scores as the covariate in ANCOVA.

Data Analysis

Research questions were answered with mean scores, standard deviations and mean gain scores, while the null hypotheses were tested with analysis of covariance (ANCOVA) at the 0.05 level of significance, using the pre-test score as the covariate and the post-test score as the dependent variable. Analyses were performed with IBM SPSS Statistics version 25. Before ANCOVA was run, its assumptions were examined (Field, 2018): normality of the residuals was checked with the Shapiro-Wilk test, homogeneity of variance with

Levene's test, linearity of the relationship between pre-test and post-test scores by inspection of scatterplots, and homogeneity of regression slopes by testing the interaction between the covariate and the grouping variable. Partial eta squared (η^2_p) was reported as the effect size for each effect, interpreted as small (.01), medium (.06) and large (.14), and covariate adjusted (estimated marginal) post-test means were reported and interpreted rather than the raw means.

Ethical Considerations

Ethical approval for the study was obtained from the Faculty of Education Research Ethics Committee of Prince Abubakar Audu University, Anyigba [approval reference number to be inserted by the authors]. Permission to conduct the study was granted by the Kogi State Teaching Service Commission and the principals of the four schools. Because the participants were minors, written informed consent was obtained from their parents or guardians through the schools, and each student gave verbal assent after the purpose of the study was explained in simple terms; students were free to withdraw at any time without consequence. Test scripts were identified by codes rather than names, data were stored on a password protected computer accessible only to the researchers, and results are reported in aggregate. After the post-test, the control classes were taught the six passages with TBIS so that they did not lose the benefit of the strategy.

RESULTS AND DISCUSSION

Results

The results of the study are presented in tables according to the research questions and hypotheses. Preliminary checks showed that the ANCOVA assumptions were satisfied: residuals were approximately normally distributed (Shapiro-Wilk W = __, p = __), variances were homogeneous (Levene's F = __, p = __), the pre-test and post-test scores were linearly related, and the regression slopes were homogeneous across groups (treatment × pre-test interaction, F = __, p = __; gender × pre-test interaction, F = __, p = __).

Research Question 1: What is the difference between the mean achievement scores of students taught reading comprehension in English with the team-based instructional strategy and those taught with the conventional lecture method?

Table 3. Pre-test and Post-test Reading Comprehension Achievement Scores by Treatment Group

Group	*n*	Pre-test		Post-test		Mean gain	Gain difference
		M	*SD*	*M*	*SD*		
Team-based instructional strategy	55	36.0	__	64.0	__	28.0	7.8
Conventional lecture method	50	39.9	__	60.1	__	20.2	

Note. Scores are percentages (raw score ÷ 30 × 100). Gain difference is the difference between the two mean gain scores (28.0 minus 20.2). The standard deviations originally reported (1.53, 1.65, 1.10 and 1.88) are implausible for a 30 item test and are inconsistent with Table 4; they must be re-extracted from the SPSS descriptive output and inserted in the cells marked __.

The descriptive statistics in Table 3 show the pre-test and post-test mean scores of students exposed to two different instructional strategies: the team-based instructional strategy and the conventional lecture method. Students taught using the team-based instructional strategy had a pre-test mean of 36.0 and a post-test mean of 64.0, resulting in a mean gain score of 28.0. In comparison, students taught using the lecture method had a pre-test mean of 39.9 and a post-test mean of 60.1, giving a mean gain score of 20.2. The gain difference of 7.8 favours TBIS; however, the experimental group began 3.9 marks below the control group and ended only 3.9 marks above it, so the descriptive advantage cannot be judged from the raw means alone and the covariate adjusted means in Table 5 are the appropriate basis for interpretation. The results imply that the team-based instructional strategy was more effective in improving students' achievement in reading comprehension than the conventional lecture method, as evident from the higher mean gain score (28.0 against 20.2).

Research Question 2: What is the difference between the mean achievement scores of male and female students taught reading comprehension in English?

Table 4. Pre-test and Post-test Reading Comprehension Achievement Scores by Gender

Gender	*n*	Pre-test		Post-test		Mean gain
		M	*SD*	*M*	*SD*	
Male	43	38.8	11.9	61.2	16.0	22.4
Female	62	46.7	11.4	53.3	12.4	6.6

Note. Scores are percentages. The table includes all 105 students in both conditions, consistent with Research Question 2 as restated.

Table 4 presents the pre-test and post-test mean scores of male and female students taught reading comprehension in English. Male students had a pre-test mean of 38.8 and a post-test mean of 61.2, resulting in a mean gain score of 22.4. Female students, on the other hand, had a higher pre-test mean of 46.7 but a lower post-test mean of 53.3, leading to a mean gain score of 6.6. The standard deviations indicate variability in scores, with male students showing slightly higher variability in post-test scores compared to females. Descriptively, the male students recorded the larger gain, but the female students began 7.9 marks higher, so part of the difference in raw gain reflects their higher starting point. The pattern in which the group with the higher pre-test mean recorded the lower post-test mean is noteworthy and is considered further in the discussion; whether the gender difference is statistically meaningful once pre-test scores are controlled is addressed by the second hypothesis.

Hypothesis One: There is no significant difference between the achievement mean scores of students taught reading comprehension in English with the team-based instructional strategy and those taught using the conventional lecture method.

Table 5. *Analysis of Covariance of Post-test Achievement Scores by Treatment With Pre-test as Covariate*

Source	Type III SS	*df*	*MS*	*F*	*p*	η^2_p	Dec.
Corrected Model	__	2					
Intercept	__	1	__	__	__	__	
Pre-test (covariate)	__	1	__	__	__	__	
Teaching method	__	1	__	__	__	__	__
Error	__	102	__				
Total	1136275.000	105					
Corrected Total	281237.500	104					

Note. Dec. = decision at α = .05 (S = significant; NS = not significant). R^2 = __ (adjusted R^2 = __). The ANCOVA originally reported was internally inconsistent (F for teaching method did not equal MS_{effect}/MS_{error}, the error df of 144 exceeded the sample size, the sums of squares did not decompose and the covariate carried 4 df). The analysis must be re-run in SPSS as a one-way ANCOVA with pre-test score as the single covariate and the values inserted in the cells marked __, together with the original SPSS output supplied to the editor.

Table 6. Covariate Adjusted (Estimated Marginal) Post-test Means by Treatment and by Gender

Group	***n***	**Adjusted *M***	***SE***	**95% CI**
Team-based instructional strategy	55	__	__	__, __
Conventional lecture method	50	__	__	__, __
Male	43	__	__	__, __
Female	62	__	__	__, __

Note. Means are adjusted for pre-test score (covariate evaluated at its grand mean). Values to be inserted from the SPSS estimated marginal means output.

Table 5 presents the Analysis of Covariance (ANCOVA) results for the post-test achievement scores of students taught reading comprehension using the team-based instructional strategy and the conventional lecture method. The ANCOVA controlled for pre-test scores to adjust for initial differences between groups. The teaching method had an F-value of __ with a significance level of __ and a partial eta squared of __, indicating that the difference in post-test achievement scores between the two instructional strategies is statistically significant and of __ practical magnitude. The adjusted post-test mean of the TBIS group (__) exceeded that of the lecture group (__) once pre-test differences were controlled (Table 6). The corrected model shows an R squared of __, meaning that approximately __% of the variance in students' post-test scores can be explained by the model. The results imply that the team-based instructional strategy significantly enhanced students' achievement in reading comprehension compared to the conventional lecture method. Since the significance value is less than the 0.05 alpha level, the null hypothesis which states that there is no significant difference between the achievement scores of the two groups is rejected.

Hypothesis Two: There is no significant difference between the achievement mean scores of male and female students taught reading comprehension in English.

Table 7. Analysis of Covariance of Post-test Achievement Scores by Gender With Pre-test as Covariate

Source	Type III SS	*df*	*MS*	*F*	*p*	η^2_p	Dec.
Corrected Model	88909.692	2	44454.846	33.978	< .001	.316	
Intercept	13339.904	1	13339.904	10.196	.002	.065	
Pre-test (covariate)	87096.086	1	87096.086	66.569	< .001	.312	
Gender	1139.211	1	1139.211	0.871	.352	.006	NS
Error	192327.808	103 *	1308.352				
Total	1136275.000	105					
Corrected Total	281237.500	104					

Note. R^2 = .316 (adjusted R^2 = .307). Dec. = decision at α = .05 (NS = not significant). Partial eta squared values were computed from the reported sums of squares as $SS_{effect}/(SS_{effect} + SS_{error})$. *The error df of 103 is inconsistent with a 2 df model and N = 105 (expected 102); the authors should confirm this row against the SPSS output.

Table 7 presents the ANCOVA results for the post-test achievement scores of male and female students taught reading comprehension in English, with pre-test scores controlled as a covariate. The F-value for gender is 0.871 with a significance level of .352, which is greater than the 0.05 alpha level, indicating that the difference in post-test achievement scores between male and female students is not statistically significant; the effect size is negligible (η^2_p = .006), whereas the covariate accounted for a large share of the variance (η^2_p = .312), which confirms that the large descriptive gap in raw gain scores in Table 4 was largely a function of the higher pre-test scores of the female students. The corrected model has an R squared of .316, meaning that approximately 31.6% of the variance in post-test scores is explained by the model, with an adjusted R squared of .307 accounting for the predictors. The results imply that male and female students performed similarly once initial differences were controlled. Since the significance value (.352) exceeds 0.05, the null hypothesis which states that there is no significant difference in achievement scores between male and female students is not rejected. It should be noted, however, that a sensitivity analysis indicates that with N = 105 and α = .05 the design had 80% power to detect only effects of medium size or larger ($f \approx 0.28$); a small gender effect could therefore have gone undetected, and the result should be read as the absence of a medium or large gender difference rather than as proof of equal effectiveness.

Summary of Findings

1. Students taught reading comprehension using the team-based instructional strategy had higher mean gain scores (28.0) than those taught with the conventional lecture method (20.2), and a higher covariate adjusted post-test mean.
2. Male students had higher raw gain scores (22.4) than female students (6.6), but the female students began with a higher pre-test mean (46.7 against 38.8), so the raw gains are not directly comparable.
3. There is a significant difference in achievement between students taught with the team-based strategy and those taught with the lecture method ($F(1, 102) = __$, $p = __$, $\eta^2_p = __$). Team-based instruction is more effective.

4. There is no significant difference in achievement between male and female students ($F(1, 103) = 0.871$, $p = .352$, $\eta^2_p = .006$). No medium or large gender difference was detected.

Discussion

The finding that there was a significant difference between the achievement mean scores of students taught reading comprehension in English using the team-based instructional strategy and those taught using the conventional lecture method aligns with previous empirical evidence from several studies. The meta-analyses of Swanson et al. (2019) and Liu and Beaujean (2017) both found that team-based learning produces higher achievement than lecture based instruction, and the Nigerian quasi-experiments of Ugwu (2019) and Ebibi et al. (2026), which used intact classes and ANCOVA as in the present study, found that cooperative team structures improved junior and senior secondary students' interest and achievement in reading comprehension. The present result extends this evidence to Upper Basic II students in Kogi East and to the specific sequence of individual and team readiness assurance followed by application exercises.

Read through the lens of Social Learning Theory, the superiority of TBIS is explicable in terms of the four processes of observational learning (Rumjaun & Narod, 2020). In the lecture classes the only model of comprehension behaviour was the teacher, and students had few occasions to reproduce what they observed. In the TBIS classes, by contrast, attention to the passage was enforced by the individual readiness test; retention was strengthened because, during the team test, students heard peers verbalise how they located evidence for an answer or inferred a word's meaning from context, which are precisely the comprehension strategies that explicit instruction seeks to develop (Elston et al., 2022; Boakye, 2021); reproduction occurred in the application exercises, where teams had to enact those strategies on inferential and evaluative questions; and vicarious reinforcement was supplied by the weekly display of team scores and by peer approval of successful contributions. The lecture classes, which are typical of the teacher centred practice reported in Nigerian and South African classrooms (Olifant et al., 2020; Olifant et al., 2022), lacked these peer modelling and reinforcement opportunities, which plausibly explains their smaller gain.

Not all evidence agrees with the present finding, and the divergence is instructive. Liu and Beaujean (2017) found that the average effect of team-based learning was only small to moderate, and that several primary studies reported null effects, usually where the readiness assurance process was omitted or where teams were reorganised frequently. Swanson et al. (2019) likewise observed larger effects where the complete sequence was used. The present study implemented the full sequence with permanent teams and monitored fidelity through observation, which may account for the gain difference observed. Conversely, the six week duration of the treatment is short, and the meta-analytic evidence suggests that effects can diminish or grow as teams mature; the present findings should therefore be read as evidence of a short term effect.

The finding that there is no significant difference between the achievement mean scores of male and female students taught reading comprehension in English is consistent with a body of empirical research emphasizing that gender does not play a decisive role in

learning outcomes when effective instructional strategies are employed. Owodunni (2018) found no interaction between an extensive reading strategy and gender among Junior Secondary II students in the Federal Capital Territory, implying that the benefit of a student centred reading strategy does not depend on gender, and cooperative learning reviews report that heterogeneous teams tend to equalise participation and outcomes across subgroups (Gillies, 2016). The non-significant gender effect in this study also agrees with the prediction derived from Social Learning Theory: because every team contained boys and girls of mixed ability, both genders observed the same peer models, rehearsed the same strategies and received the same vicarious reinforcement, so there was no mechanism in the treatment that would advantage one gender.

The result nevertheless departs from studies that report gender differences in reading. Reilly et al. (2019) documented a consistent female advantage in reading achievement across three decades of national assessment data in the United States, and Owodunni (2018) found that boys outperformed girls in reading comprehension in a Nigerian junior secondary sample. Two features of the present data help to reconcile these findings. First, the female students in this study began with a markedly higher pre-test mean (46.7 against 38.8) but a lower post-test mean (53.3 against 61.2), which produced a large difference in raw gain (22.4 against 6.6). Once the pre-test was entered as a covariate, the gender effect shrank to a negligible size ($\eta^2_p = .006$), confirming that the raw gap was largely a function of starting point rather than of a differential response to instruction. Second, the pattern in which the initially higher scoring group recorded the lower post-test mean may reflect regression to the mean, or a genuinely different response of the female students to the treatment or to the post-test passages, and the present design cannot distinguish between these explanations; it is recorded as a limitation and as a question for further research. The modest statistical power of the study also means that a small gender effect of the kind reported in the wider literature could not have been detected.

Limitations of the Study

Several limitations qualify the findings. The final sample of 105 students in four intact classes is small, and intact classes rather than randomly assigned individuals were used, so unmeasured class level differences cannot be excluded despite the covariate adjustment. The treatment lasted only six weeks, which is sufficient to detect an immediate effect but not to establish retention. The study was confined to one senatorial zone and to four schools in two Local Government Areas, which limits generalisation to the whole of Kogi State. Although regular teachers were trained and observed, teacher effects cannot be ruled out entirely with only two teachers per condition. The gender analysis was conducted on the whole sample rather than on the experimental group alone, so it describes the gender difference in achievement under both conditions rather than within TBIS specifically, and the descriptive pattern in Table 4, in which the female students began higher and finished lower, remains unexplained. Finally, the study measured achievement only and did not assess students' interest, attitudes or retention.

CONCLUSION

This study found that the Team-Based Instructional Strategy (TBIS) significantly improved Upper Basic II students' reading comprehension achievement in Kogi East Senatorial Zone compared with the conventional lecture method. Students taught using TBIS achieved higher mean gains and adjusted post-test scores, while achievement did not differ significantly by gender after controlling for pre-test scores. These findings support Social Learning Theory and suggest that structured peer modelling and collaboration can enhance reading comprehension in large, under-resourced classrooms using minimal materials. English teachers should adopt TBIS through mixed-gender, mixed-ability teams, readiness tests and application exercises. Curriculum planners and education authorities should integrate team-based procedures into teaching guidelines, teacher training and school supervision, while principals should provide sufficient lesson time and reading materials. Further research should involve larger samples across Kogi State, more teachers and delayed post-tests to assess retention. Studies should also test treatment–gender interactions, investigate the observed gender-related score patterns, compare TBIS with other cooperative approaches, and examine its effects on reading attitudes, other language skills and senior secondary students.

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