

COMPARATIVE EFFECTS OF CLASS WIDE TUTORING INSTRUCTIONAL STRATEGIES ON ACADEMIC ACHIEVEMENT OF BUSINESS STATISTICS STUDENTS IN COLLEGES OF EDUCATION IN NORTH-EAST NIGERIA.

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ABSTRACT

This study Investigated the Comparative Effects of Class Wide Tutoring Instructional Strategies on Academic Achievement of Business Statistics Students in Colleges of Education in North-East Nigeria. The study was guided by two specific objectives with corresponding research questions and hypotheses. The quasi-experimental research design was adopted for the study. The population of the study was 879 students and 107 were used for the study. The two intact classes were randomly assigned to one control group (taught with the conventional lecture method) and Class-wide peer tutoring strategies. Data were collected using the Business Statistics Achievement Test (BUSAT) and the Business Statistics Interest Questionnaire (BSIQ), which were validated by three experts and pilot tested at Kano. A reliability coefficient of 0.814 and 0.719 were obtained for achievement test and interest questionnaire. Data were collected with the aid of four research assistants. Data collected were analyzed with the aid of statistical package for social science (SPSS). Descriptive statistics of mean, standard deviation and mean difference was used to answer the research questions. Inferential statistics of ANOVA and independent t-test were used to test the null hypotheses at a 0.05 significance level. The findings revealed among others that class wide peer tutoring instructional strategies have positive and significant effect on the academic achievement of business education students in Business Statistics. The study concluded that the adoption of class wide peer tutoring strategies will help in enhancing students' academic achievement in Business Statistics. It was recommended among others that Business Statistics lecturers should incorporate class wide peer tutoring strategies into their teaching to improve learning outcomes, and curriculum planners should consider these strategies for curriculum reforms.

Keywords: *Class Wide Tutoring, Academic Achievement, Business Statistics, Colleges of Education*

Introduction

Business Statistics is a compulsory course for all NCE II Business Education students across Nigerian colleges of education. The course provides learners with essential competencies in analyzing data derived from academic and business contexts, applying suitable statistical techniques, and interpreting results to facilitate sound decision-making. Its inclusion in the NCE Business Education curriculum by the National Commission for Colleges of Education (NCCE, 2020) underscores its critical role in preparing students for business decision-making and research activities. According to the NCCE (2020), the specific objectives of Business Statistics are to: equip students with the ability to summarize information for decision support, understand process control and performance evaluation, apply statistical methods to generate reliable forecasts, critically evaluate the work of others, and conduct basic data analyses. To realize these objectives, the

curriculum content of Business Statistics integrates selected topics from taxation, business mathematics, finance, and financial accounting (Hubor et al., 2021).

In spite of the recognized importance of Business Statistics to Business Education students, empirical evidence suggests that learners' achievement, interest, and retention in the course remain poor (Abrami et al., 2014; Baraya et al., 2021). Belema, as cited in Ukpong and Bepeh (2014), along with Longjohn and Kenneth (2022), observed that academic performance and knowledge retention in quantitative subjects are dishearteningly low, which has consequently affected students' persistence in tertiary institutions across Nigeria. Similarly, Obinna, also cited in Ukpong and Bepeh (2014), reported failure rates ranging from 60% to 75% in mathematics-related courses, including Business Statistics, within Nigerian higher education institutions. Furthermore, Hubor et al. (2021) examined colleges of education in north-central Nigeria and found that only 43%, 49%, and 46% of students passed Business Statistics in the 2016–2017, 2017–2018, and 2018–2019 academic years, respectively. This persistent low achievement negatively impacts students' cumulative grade point averages (CGPA) and extends their time to graduation.

Various factors have been identified as contributors to this poor performance. Scholars including Adamu and Kusa (2018) have pointed to teaching methodology as a primary determinant of Business Education students' success in quantitative courses. Supporting this view, Isa et al. (2020), Angura and Abakpa (2018), and Anigbo and Idigo (2019) all reported that instructional methods significantly influence academic achievement in numerical subjects.

Class-wide peer tutoring (CWPT) is widely regarded as an educationally robust approach that enhances academic, behavioral, and social outcomes by fostering collaboration, which in turn increases response opportunities and active engagement in learning (Yashvinder & Sujatha, 2018). In a CWPT setting, students are organized into pairs to collaboratively master academic content. Within each pair, one student assumes the role of the tutor, presenting content prompts (e.g., a spelling word, a mathematical problem, or a reading instruction) to the partner. The other student, serving as the tutee, responds verbally or in writing, while the tutor monitors and evaluates the accuracy of those responses (Fink, 2020). Existing research supports the positive effect of peer tutoring on student academic outcomes. However, no previous study has specifically examined the comparative effects of class-wide tutoring instructional strategies on the academic achievement of Business Statistics students in colleges of education in North-East Nigeria. This gap in the literature motivated the present investigation.

Statement of the Problem

For several years, students' performance in Business Statistics across colleges of education in northeastern Nigeria has remained consistently poor. Preliminary investigations conducted by the researcher revealed that some institutions in the study area recorded less than 50% annual pass rates in this course. An analysis of student performance over a five-year period (2017–2021) showed that in 2017, only 45% of students who sat for the examination passed, with 60% of those passes being low grades. In 2018, the pass rate declined further to 42%, and among those who passed, 70% earned low grades. A modest improvement occurred in 2019, with a pass rate of 47%, yet 65% of successful students still scored below a C grade. In 2020, the pass rate dropped again to 46%, and 68% of those who passed achieved below a C grade. The situation worsened in 2021, with the pass rate falling to 40%; of those who passed, 72% earned grades below a C grade. Collectively, the data from 2017 to 2021 reveal a persistent pattern of low student achievement in the course (Analysis of Examination Records, Department of Business Education, [Colleges of Education], 2017–2021).

This sustained underachievement in Business Statistics has adverse consequences for students' cumulative grade point averages (CGPA). Anigbo and Idigo (2019) similarly observed that

failure rates in numerical courses negatively affect students' CGPA. More concerning is that repeated failures in the course result in carryovers, which prolong graduation timelines, disrupt career plans, and diminish student motivation. Furthermore, the financial repercussions of carrying over the course impose additional burdens on parents and guardians, who must cover extra tuition fees, accommodation costs, and related expenses. This financial strain creates a recurring cycle of hardship affecting families and potentially derailing students' future educational aspirations. In light of these challenges, this study seeks to investigate the effects of peer tutoring strategies on the interest, achievement, and retention of Business Statistics students in colleges of education in North-East Nigeria.

Objectives of the Study

The study investigated the Effects of Peer Tutoring Strategies on Interest, Achievement, and Retention of Business Statistics Students in Colleges of Education in North-East, Nigeria. Specifically, the study sought to:

- i. Determine the difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups in Colleges of Education in North-east Nigeria.
- ii. Determine the difference in the post-test mean academic achievement scores of students taught business statistics using class-wide peer tutoring and conventional teaching method in colleges of education in North-east Nigeria.

Research Questions

Based on the specific objectives, the following research questions were generated and guided the study: -

- i. What is the difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups in Colleges of Education in North-east Nigeria?
- ii. What is the difference in the post-test mean academic achievement scores of students taught business statistics using class-wide peer tutoring and conventional teaching method in colleges of education in North-east Nigeria?

Research Hypotheses

Based on the research Objectives, the following null hypotheses were formulated and tested in the cause of this study:

- i. There is no significant difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups in Colleges of Education in North-east Nigeria.
- ii. There is no significant difference in the post-test mean academic achievements scores of students taught business statistics using class-wide peer tutoring and Conventional teaching methods in Colleges of Education in North-east Nigeria.

Theoretical framework

The study anchored on the following theories such Jerome Bruner's Cognitive Theory and Vygotsky's Social Constructivism (1978) were particularly pertinent to this study.

Jerome Bruner's cognitive theory (1960)

According to Bruner, students would learn more if given the freedom to explore ideas on their own. In essence, Bruner views learning as occurring within the learner. Accordingly, he

proposes that educators set up their classes so that students can learn from each other as well as from their own active participation. The teacher's job is to lead the students on a journey of discovery. He states that the role of the teacher is to guide the students or arrange the curriculum in a spiral fashion so that they are always building on what they have already learned (Bruner, 1960).

According to Bruner's approach, learning is an active process in which students build new concepts or ideas using both their prior and current knowledge. This theory is related to the study because peer tutoring, whether it be unidirectional, bidirectional, or class-wide, is a learning process that lets students explore ideas independently and also pick up knowledge from their peers.

Vygotsky's social constructivism (1978)

The second theory under examination is Vygotsky's (1978) theory of social constructivism. This theory of learning provides the link between the sociocultural and the process of learning. The idea holds that people can learn from one another since knowledge is co-constructed. According to Vygotsky, learning occurs when others help oneself as in class-wide peer tutoring. A theoretical ground for Peer Tutoring can be found in Vygotsky's idea of the Zone of proximal Development. This theory holds that peers co-construct new meanings and cognitive structures from learning experiences. The core tenet of Vygotsky's theory is that children's proximal development in social behavior determines their cognitive development. Peer tutoring strategies (Uni-directional, Bi-directional and class-wide) allows for the development of a wider range of talents than would be possible to achieve on its own which eventually can lead to students' academic achievement and retention.

The breadth of talents that can be developed through peer cooperation is greater than what can be achieved alone. According to Vygotsky, learning occurs through social bargaining within a cultural environment. Vygotsky saw direct instruction as the finest method of teaching and learning, in which a more competent peer (Uni-directional) or teacher assists a student in learning and development by telling, asking, hinting, displaying, attracting attention, encouraging, and reminding learners.

Finally, Vygotsky's and Jerome theories were based on the concept of social interaction via grouping by peers and more skilled adults with each learner's Zone of Proximal Development. They have direct link with peer tutoring strategies as these were also included in the teaching methodologies of peer tutoring groups. The theory's emphasis on pairs and student interaction makes it relevant to peer tutoring strategies (Uni-directional, Bi-directional and class-wide peer tutoring's). Through peer tutoring strategies (Uni-directional, Bi-directional and class-wide peer tutoring's), students learn from one another, support one another, and co-construct knowledge, according to the theory. Similarly, peer tutoring strategies (Uni-directional, Bi-directional and class-wide peer tutoring's) is linked with those components of social constructivist theory that promote knowledge production through communication and dialogue because of the social interaction between student tutor and tutee. The theories are relevant to this work in that they emphasize the active participation of individuals, on which the study is building.

Methodology

The Study adopted quasi experimental research design. The quasi-experimental design was used since the class of students were already been organized into intact classes to provide for stability and avoid disruption of class lessons and class arrangement. According to Creswell and Creswell (2018), quasi-experimental designs are distinguished from true experimental designs by the absence of random assignment, a condition that often arises when conducting research in naturalistic settings such as schools or organizations. In such contexts, researchers frequently rely

on "intact groups" where existing structures cannot be disrupted for the sake of random assignment. The population of the study Comprised 879 NCE II Business Education students offering Business Statistics in the 2024/2025 academic session in 9 colleges of education in North-east of Nigeria. The sample size for the study was 184 students drawn from two colleges of Education offering business education based on their individual intact class size. According to Cambell and Stanley (1956); Olayiwola (2007); Sambo (2008) in quasi-experimental design, intact samples in their natural setting like classrooms are used. A simple random sampling technique was used to select the participating colleges using balloting in order to ensure unbiased representation and minimize selection bias of respondents from the colleges as recommended by Hair, et al (2023). The researcher wrote the names of all Colleges of Education in the study area on piece of papers and asked neutral body to select four. After the selection, the selected Schools were randomly assigned to two groups. Federal College of Education (Yola) with 41 students was assigned to teach using class wide peer tutoring and college of education Zing with 66 students was assigned to teach the control group using conventional lecture method. The study used two separate instruments for data collection as follows: Business Statistics Achievement Test (BUSAT). Business Statistics Achievement Test (BUSAT) developed by the researcher. The test items were developed by the researcher based on the topics to be covered during the study. The instrument was developed based on the six-blooms taxonomy of educational objectives.

The BUSAT was divided in to (Pretest, Post-test and retention). The pretest otherwise known as BUSAT I was used to determine the students' achievement in business statistics prior to treatment. The Post-test BUSAT II a reshuffle of BUSAT I was used to determine the academic achievement of business statistics students after the treatment. While the BUSAT III a reshuffle of BUSAT II was used to determine the students' retention in business statistics. BUSAT comprises 40 multiple choice questions on business statistics with four optional answers (A - D) but only one is a correct answer.

The validation of the instruments in this study was conducted through a systematic process involving of four experts two from Modibbo Adama University, Yola, one from Adamawa State University, Mubi and one from Federal College of Education, Yola. who assessed both the face validity and content validity of the Business Statistics Achievement Test (BUSAT) and the interest inventory. The experts evaluated the instruments for suitability, appropriateness, clarity, and comprehensiveness. Their feedback led to the refinement of the instruments, including the reduction of test items from 50 to 40. This rigorous validation process enhanced the quality of the instruments and strengthened the overall validity of the study's findings. Before producing the final copy that was used for the study, all of the expert corrections were impacted, and their opinions were harmonized and taken into account. The use of experts is a widely recommended practice for establishing both face and content validity (Hair et al., 2021; Creswell & Creswell, 2018).

A pilot test of the instruments was carried out in colleges of education Kano State, Nigeria. 153 NCE II Business Education students from the 2023/2024 academic session across two colleges of education in Kano State were used. According to Hair et al. (2021), pilot study samples for reliability testing should typically range between 30 and 100 participants, depending on the complexity of the instrument and the intended statistical analyses. A sample of 50 or more is considered adequate for obtaining stable estimates of reliability coefficients. The selected schools were the Federal College of Education, Kano, and Sa'adatu Rimi College of Education, where intact classes were used. The respondents were chosen because they have common characteristics with the study area. The data collected were analyzed with the aid of statistical package for social science (SPSS) version 27. The reliability of the Business Statistics Achievement Test (BUSAT) was obtained using the Pearson Product-Moment Correlation (PPMC) method. The choice of reliability methods was guided by the nature of each instrument and the type of reliability evidence required. For the Business Statistics Achievement Test (BUSAT), test-retest reliability was established using the

Pearson Product-Moment Correlation (PPMC) coefficient (Creswell & Creswell, 2017). This method was selected because achievement tests are expected to demonstrate stability over time; a high correlation between two administrations indicates that the test yields consistent results independent of transient conditions at the time of testing (Kianinezhad & Kianinezhad, 2025). Anthoine et al. (2022) further emphasizes that for test-retest reliability studies using Pearson correlation, a sample size of at least 50 participants is necessary to achieve adequate statistical power and precision in estimating the intraclass correlation coefficient (ICC) or Pearson correlation coefficient.

The Pearson correlation between the first and second test administrations is 0.814 which indicates a strong positive relationship between the two sets of scores (Cook & Wind, 2024). According to Ochei (2016) and Huitema (2020), an instrument is considered reliable if the coefficient lies between 0 and 1, with a closer value to 1 indicating higher reliability, and a closer value to 0 indicating lower reliability.

The research assistants were employed to aid the data collection. The research assistants were two and they are the course lecturers of the business statistics in their respective colleges. The researcher provided an orientation to the research assistants and direct them with the method and procedures for the data collection. The orientation and training were guided by a drawn lesson plans in appendix II. On the training of the regular Business statistics lecturers (research assistants), the researcher briefed those in experimental schools on how to group the students into small groups of threes and fours based on the class size and ratio of peer tutors and tutees. The researchers also highlighted how to monitor the groups during the tutoring process, acting as facilitators in the process (Experimental group) and when necessary, ensuring usage immediate feedback. After the training a micro teaching was organized and areas of difficulties were corrected. The exercise lasted for two days. To avoid any bias in the study and preventing the respondents from acting in any manner that can affect the outcome of the study, the researcher used the research assistants who were the regular Business statistics lecturers of each of the schools. The researcher was introduced to the students by the research assistants to creating a good rapport with the students. At the end of the training, the researcher handed over copies of the comprehensive lesson plans (instructional packages) to the research assistants. These comprised six instructional units and instructional materials like charts, textbooks, and models. Each lesson was scheduled for two periods per week.

Experimental procedures

In the first phase of data collection, the researcher in conjunction with the research assistants from the selected schools administered a pretest and pre-intervention instruments to the students. The test and pre-intervention instruments lasted for 2hrs. The test scripts were collected and marked by the researcher using the drawn marking scheme.

The treatment which was teaching of Business statistics was conducted using uni-directional peer tutoring for experimental group while conventional teaching method was used for the control group, a post-test and post intervention instruments were administered to both the experimental and control group using the Business Statistics Achievement Test II (BUSAT II) in the fourth week. One hour was allocated for the BUSAT II. The scripts were marked and recorded by the researcher. This exercise lasted for four weeks. while the whole exercise lasted for seven weeks.

The data obtained from the study were analyze with the aid of Statistical Package for Social Sciences (SPSS) 27. The package was used to run descriptive statistics of mean scores and standard deviation to answer the research questions. The results were interpreted using the following scale, as adapted from Adamu and Kusa (2018): 0.1 - 0.99 Little Difference (LD), 1.0 - 1.99 Very little difference (VLD), 2.0 - 4.99 Mild difference (MID), 5.0 - 9.99, Much difference (MD) and 10 and above Very Much Difference (VMD) were used for the interpretations of the results.

For test of hypotheses, inferential statistics of independent t-test was employed to test the null hypothesis at a 0.05 significance level as well (Pallant, 2020). He asserted that an independent samples t-test is suitable for determining whether there is a statistically significant difference between the means of two groups.

The decision rule was based on the p-value. If the p-value was less than or equal to 0.05 ($p \leq \alpha$), the null hypotheses were rejected; otherwise, they were retained ($p > \alpha$). Where applicable, the Tukey HSD post hoc test was used for multiple comparison analysis. To determine the specific locations of differences between the groups, a Tukey Honestly Significant Difference (HSD) post hoc test was performed. This test was selected because it maintains the familywise error rate @ Alpha = .05 while providing more statistical power than the Bonferroni correction for all pairwise comparisons and other post hoc tools (Field, 2018).

Results

The results of the data collected were presented in two phases as follows: results of research questions and results of research hypotheses.

Results of research questions

Results of research questions were presented in tables 1 to 2

Research question one

What is the difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups in Colleges of Education in North-east Nigeria?

The descriptive statistics in Table 1 was used to answer Research Question One on the difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups. From the table, the conventional group (N = 66) had a mean score of 25.58 with a standard deviation of 7.77, while the class-wide group (N = 41) also had a mean of 27.15 with a standard deviation of 9.57. with a mean different of 1.61, the result indicates a very little difference and the pre-test mean achievement scores were relatively close across all groups, suggesting homogeneity before the treatment.

Table 1: Mean and Standard Deviation on Difference in the Pre-Test Mean Academic Achievement of Business Statistics Students in Control and Experimental Groups

Group	N	Mean	S.D	Mean Difference
Conventional	66	25.58	7.77	1.57
Class-wide	41	27.15	9.57	

N=Number of Students in the Group, SD=Standard Deviation

Research question two

What is the difference in the post-test mean academic achievement scores of students taught business statistics using class-wide peer tutoring and conventional teaching method in colleges of education in North-east Nigeria?

In Table 2, the comparison between the class-wide peer tutoring group and the conventional group is presented. The class-wide group (N = 41) had a mean score of 47.02 (SD = 16.29), which was significantly higher than the conventional group's mean of 24.80 (SD = 5.69). The mean difference between the two groups was 22.22 indicating very much difference (VMD) in favor of the Class-Wide strategy. This demonstrates that class-wide peer tutoring strategy substantially enhanced students' performance compared to the traditional approach.

Table 2: Mean and Standard Deviation on Difference in the Academic Achievement of Students Taught Business Statistics Using Conventional and Class-Wide Strategies

Group	N	Mean	S. D	Mean difference
Conventional	66	24.80	5.69	22.22
Class wide	41	47.02	16.29	

N=Number of Students in the Group, SD=Standard Deviation

Hypotheses Testing

The null hypotheses were tested at 0.05 level of significance. Presented in table 3 to 4

Hypothesis one

There is no significant difference in the pre-test mean academic achievement scores of business statistics students in experimental and control groups in Colleges of Education in North-east Nigeria.

An independent samples t-test was conducted to compare the academic achievement of students taught Business Statistics using the Conventional Teaching Method ($n = 66$) and those taught using Class-Wide Peer Tutoring (CWPT) ($n = 41$). The mean achievement score for the conventional group was 25.58 ($SD = 7.70$), while the CWPT group had a higher mean score of 27.15 ($SD = 9.57$).

The t-test results revealed a calculated t-value of -0.93 with 105 degrees of freedom. The associated p-value is .355, which is greater than the conventional alpha level of 0.05. Therefore, there is no statistically significant difference in academic achievement between the two groups at the 0.05 significance level.

The null hypothesis (H_{01}) is retained, indicating that the observed difference in mean scores (1.57 points in favor of the CWPT group) is not large enough to be considered statistically significant. This suggests that while Class-Wide Peer Tutoring produced a slightly higher mean achievement score, the teaching method did not lead to a significantly different academic outcome compared to the conventional method in this sample.

Table 3: Independent Sample t-test on the Academic Achievement of Students Taught Business Statistics Using Conventional Teaching Method and Class Wide Peer Tutoring

Group	N	Mean	Std. Deviation	T	Df	p-value	Remark
Conventional	66	25.58	7.7	-0.93	105	.355	H_{01} Retained
Class-wide	41	27.15	9.57				

Hypothesis two

There is no significant difference in the post-test mean academic achievements scores of students taught business statistics using class-wide peer tutoring and Conventional teaching methods in Colleges of Education in North-east Nigeria.

An independent samples t-test was performed to compare the academic achievement of students taught Business Statistics using the Conventional teaching method and those taught using the Class-Wide Peer Tutoring strategy. The Conventional group consisted of 66 students with a mean achievement score of 24.80 ($SD = 5.69$), while the Class-Wide group comprised 41 students with a substantially higher mean achievement score of 47.02 ($SD = 16.29$). The t-test assumed unequal variances based on the Levene's test result, as reflected in the adjusted degrees of freedom ($df = 46.133$). The calculated t-value was -8.423, with an associated p-value of .000. The

independent samples t-test revealed a statistically significant difference in academic achievement between the two groups ($t(46.133) = -8.423, p < .001$). The Class-Wide Peer Tutoring group ($M = 47.02, SD = 16.29$) performed significantly better than the Conventional group ($M = 24.80, SD = 5.69$). The effect size was very large (Cohen's $d = 2.02$), indicating that the Class-Wide Peer Tutoring strategy had a practically and theoretically meaningful impact on student achievement in Business Statistics. Consequently, the null hypothesis (H_0) is rejected.

Table 4: Independent Sample t-test on the Academic Achievement of Students Taught Business Statistics Using Conventional Teaching Method and Class Wide Peer Tutoring

Group	N	Mean	Std. Deviation	T	Df	p-value	Remark
Conventional	66	24.8030	5.68999	-8.423	46.133	.000	H_0 Rejected
Class-wide	41	47.0244	16.28571				

Summary of the Findings

Based on the analysis of data and interpretation of results, the study yielded the following findings:

- i. No different was found in results of research question one and test of the corresponding null hypothesis in the pre-test mean academic achievement of students in the control and experimental groups
- ii. The findings of research question five and its corresponding null hypothesis indicated that students taught with the class-wide peer tutoring strategy performed better than those taught using the conventional method, recording the highest numerical mean difference among all strategies.

Discussion of the Findings

The analysis for the research question one in table 1 and the test of corresponding null hypothesis one in table 3 confirmed that all student groups involved in the study had comparable levels of knowledge. The pre-test means scores for the Class-wide Peer tutoring, and Conventional Teaching groups were very similar. An Analysis of The finding that the null hypothesis (H_{01}) was retained, as shown in Table 3, indicates that there is no statistically significant difference in academic achievement between students taught Business Statistics using the Conventional Teaching Method and those taught using Class-Wide Peer Tutoring (CWPT), $t(105) = -0.93, p = .355$ ($t(105) = -0.93, p = .355$). Although the mean achievement score of the CWPT group ($M = 27.15$) was slightly higher than that of the conventional group ($M = 25.58$), this difference was not large enough to be attributed to the instructional method rather than random chance or sampling error. This outcome suggests that CWPT was neither significantly superior nor inferior to the conventional method in improving students' immediate academic achievement in Business Statistics. This finding aligns with previous research by Ra'ed and Reem (2016) and Baraya et al. (2021), this is also in line with the study carried out by Abdulkarim et al. (2022). Who also reported equivalent pre-treatment performance between their experimental and control groups. As noted by Nwafor et al. (2019), a pre-test typically reveals equivalent entry-level knowledge among participants, ensuring that any subsequent differences in achievement can be more confidently attributed to the teaching methods applied during the experiment.

In discussing research question two in table 2 and the result of null hypothesis two in table 4, the findings revealed that the class-wide group performed significantly higher than the conventional group. This demonstrates that class-wide peer tutoring strategy substantially enhanced students' performance compared to the traditional approach. It is further confirmed by the independent sample t-test used for testing hypothesis five. It's reported that students taught business statistics using class-wide tutoring significant achieved higher than those taught using the conventional approach. The hypothesis was therefore rejected. It was therefore concluded that class-wide instructional approach has positive effect on the academic performance of students in business statistics, similar findings was reported by Ifeanyi, E. (2022) who stated that exposing senior secondary school students to class-wide peer tutoring (CWPT) instructional strategy resulted to significantly higher achievement in financial accounting. In another vain, Virginia et al. (2023), Akanbi (2022) and Yusuf and Yusuf (2015) also reported that using class wide peer tutoring instructional mode enhances business education students' (OTM option) academic achievement in spreadsheet when compared with the traditional teaching method and Akanbi also revealed that there was a significant difference between the performance of the experimental group and control group in favour of the experimental group and no significant difference in the performance of male and female students when both are taught Projectile Motion using CWPT.

Conclusion

In conclusion, this study provides robust and conclusive evidence that class-wide peer tutoring strategies is all highly effective in improving Business Statistics students' academic achievement compared to conventional teaching methods in Colleges of Education in North-east Nigeria. The conventional teaching method, as evidenced by consistently lower performance across all outcome measures, is inadequate for maximizing student success in Business Statistics. These findings have significant implications for curriculum design, teacher education, and classroom practice in Nigerian tertiary institutions.

Recommendations

In light of the findings, the following recommendations are made:

- i. Teachers should adopt peer tutoring strategies in the teaching of business statistics to improve students' achievement, retention, and interest.
- ii. Curriculum developers and policymakers should incorporate peer tutoring strategies into teaching guidelines for business-related subjects to promote learner-centered pedagogy.

References

- Abrami, P. C., Poulsen, C., & Chambers, B. (2014). Teacher motivation to implement an educational innovation: Factors differentiating users and non-users of cooperative learning. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 24(2), 201–216.

- Adamu, I., & Kusa, G. W. (2018). Effect of peer-tutoring learning teaching method on academic performance of financial accounting students in Federal Unity Colleges in North-Eastern Nigeria. *Journal of Advanced Research in Social Sciences*, 1(1), 7–15.
- Akanbi, A. O. (2022). Effect of class-wide peer tutoring on students' performance in Physics in Dekina, Nigeria. *Journal Education*, 8(3), 1096–1103.
- Angura, M. T., & Abakpa, V. O. (2018). Impact of cooperative instructional strategies and conventional teaching methods on students' achievement and interest in Upper Basic Education Science and Technology in Nigeria. *International Journal of Innovative Research and Development*, 7(2), 38–45.
- Anigbo, L. C., & Idigo, E. (2019). Factors affecting Senior Secondary School students' Mathematics interest in Enugu State. *Journal of Science and Computer Education (JOSCED)*, 17, 17–26.
- Anthoine, E., Moret, L., Regnault, A., Sébille, V., & Hardouin, J. B. (2022). Sample size requirements for reliability studies using intraclass correlation coefficients: A simulation study. *Statistical Methods in Medical Research*, 31(1), 112–126.
- Baraya, U. A., Adamu, I. A., & Yusuf, U. B. (2021). Effect of team-based strategy on Business Education students' achievement in Business Statistics in Federal College of Education (Technical), Gombe. *Vunoklang Multidisciplinary Journal of Science and Technology Education*, 9(2), 132–138.
- Bruner, J. (1960). *The process of education*. Harvard University Press.
- Cambell, D. T., & Stanley, J. C. (1965). *Experimental and quasi-experiment designs for research*. Houghton Mifflin Company.
- Cook, R. M., & Wind, S. A. (2024). Item response theory: A modern measurement approach to reliability and precision for counseling researchers. *Measurement and Evaluation in Counseling and Development*, 57(2), 116–135.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.
- Fink, S. (2020). Benefits of peer teaching. <https://www.summertech.net/benefits-of-peerteaching/>

- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2021). *Multivariate data analysis* (9th ed.). Cengage Learning.
- Hair, J. F., Jr., Page, M., Brunsveld, N., Merkle, A., & Cleton, N. (2023). *Essentials of business research methods* (5th ed.). Routledge.
- Hubor, K. A., Ibrahim, A., Deba, A. A., & Inti, M. M. (2021). Self-efficacy as a predictor of attitude and academic achievement among Colleges of Education Business Statistics students in North-Central Nigeria. *Trends in Educational Studies Journal*, 13(1), 133–143.
- Huitema, B. E. (2020). *The analysis of covariance and alternatives: Statistical methods for experiments, quasi-experiments, and single-case studies* (2nd ed.). Wiley.
- Ifeanyi, E. (2022). Effect of class-wide peer tutoring instructional strategy on senior secondary school students' achievement, interest and motivation in Financial Accounting in Imo State [Unpublished master's thesis]. Michael Okpara University of Agriculture, Umudike.
- Isa, S. G., Mammam, M. A., Badar, Y., & Bala, T. (2020). The impact of teaching methods on academic performance of secondary school students in Nigeria. *International Journal of Development Research*, 10(7), 37382–37385.
- Kenton, W., Walters, T., & Li, T. (2022). Analysis of variance (ANOVA): Explanation, formula and applications. Investopedia. <https://www.investopedia.com/terms/a/anova.asp>
- Kianinezhad, N., & Kianinezhad, M. (2025). Comparative evaluation of C-test reliability using classical and modern psychometric methods. *Language Education & Assessment*, 8(1), Article 2279.
- Longjohn, T., & Kenneth, O. (2022). Effect of peer tutoring on senior secondary school students' academic performance in Mathematics in Ahoada East Local Government Area of Rivers State. *Studies in Humanities and Social Sciences*, 7(4), 164–169.
- Mitra, S. (2023). How are students learning in a Business Statistics course? Evidence from both direct and indirect assessment. *INFORMS Transactions on Education*, 23(2), 95–103.
- National Commission for Colleges of Education (NCCE). (2020). *Minimum standards for NCE teachers*.
- Nwafor, C. E., Obodo, A. C., & Okafor, G. (2019). Effect of peer tutoring teaching method on students' academic achievement in economics. *Journal of Educational Research and Development*, 12(1), 45–54.

- Ochei, I. (2016). *Research methods in education*. Hordens Publishers.
- Olayiwola, I. (2007). *Introduction to principles and methods of teaching*. Gaskiya Ideal Printers and Publishers.
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS (7th ed.)*. Routledge.
- Ra'ed, A., & Reem, A. (2016). The effect of peer teaching on mathematics academic achievement of the undergraduate students in Oman. *International Education Studies*, 9(5), 124–132.
- Sambo, A. A. (2008). *Research methods in education*. Stirling-Horden Publishers.
- Ukpong, O., & Bepeh, S. (2014). Perceived difficulties in Business Statistics and Business Education students' performance in Business Statistics in Colleges of Education in South-South, Nigeria. *Journal of Education and Practice*, 5(2), 32–39.
- Virginia, N. O., & Anthonia, C. O. (2023). Effect of classwide peer tutoring on Business Education students' academic performance in spreadsheet for sustainable development in universities in South-East, Nigeria. *Journal of Educational Research*, 8(1), 2354–2772.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Yashvinder, K., & Sujatha, M. J. (2018). Peer tutoring an instructional strategy: A systematic approach. *Scholarly Research Journal for Humanity Science & English Language*, 6(27), 7792–7798.
- Yusuf, H. T., & Yusuf, A. (2015). Effect of class-wide peer-tutoring technique on the performance of slow learners in Economics in Ilorin-South, Kwara State Nigeria. *Journal of Science, Technology, Mathematics and Education (JOSTMED)*, 11(3), 277.