

**INNOVATIVE INSTRUCTIONAL STRATEGIES
AS PREDICTORS OF STUDENTS' ACADEMIC
ACHIEVEMENT IN ENGLISH LANGUAGE AT
THE SECONDARY SCHOOL LEVEL IN
ANAMBRA STATE**

Ezenwosu, Ngozi, E., PhD

Department of Educational Foundations Faculty of
Education, Nnamdi Azikiwe University, Awka
ne.ezenwosu@unizik.edu.ng +2348033880373

Osuchukwu, Caroline Nonye, PhD

Department of English Language and Literary
Studies, Nwafor Orizu College of Education, Nsugbe,
carolineosuchukwu1@gmail.com +2348030998834
ORCID ID NO: 0000-0001-7798-9927

Abstract

The elucidation of innovative instructional techniques in educational settings impacts students' learning styles, enhances engagement through personalized learning strategies, and advances academic achievement in English language. The study explored innovative instructional strategies as predictors of academic achievement in English language. Our study adapted a predictive correlational research design. The sample size

is made up of 857 secondary school students in Anambra State. Our findings showed that in the unique contribution, technology devices, brainstorming, and inquiry-based learning positively contributed to the predicting model. Also, the analysis of variance revealed that the regression equation was significant ($3, 853) = 6.006, p < .05$. This implies that at least one of the independent variables significantly predicted students' digital learning readiness scores. Based on these findings, it was recommended that students should utilize technology devices, brainstorming, and inquiry-based teaching and learning strategies in the learning of English language in the classroom so as to increase interest and achievement in the English language proficiency.

Keywords: Technology Devices, Brainstorming,
Inquiry-Based Learning, English Language,
and Academic Achievement

Introduction

The development of students' mental abilities has become a critical goal of the educational process at all level. This is because the progress of countries is measured by the capacity to develop the minds of their children. This developmental process is characterized by changes surrounded by many challenges that included scientific process, technological development and openness to the world of communication. In order to cope with these challenges in the educational process, the usage of innovative instructional strategies should be

considered as an alternative for the development of creative minds capable of solving existing problems in the learning contexts. The choice of effective instructional methods is not only to improve the level of achievement of students in the preparation period, but also to become part of the preparation program and to be helpful in the future practice of education (Malkawi & Smadi, 2018). This technique of teaching is based on the interaction between the teacher and the learner or between the learner and other learners, as it helps in the development of thinking strategies or reduces the idea of automation that are given in one direction from the teacher to the learner.

Teaching strategies/methods refer to the style of instructional delivery adopted by a teacher. Shotoyeke (2014) opined that teaching methods can be defined as practical application of teaching principles based on the nature of the learner, the nature of the subject and their learning needs. To make sure that our students are well equipped with the necessary tools to face the demands and expectations of the future, there has been a clear need for innovative instructional practices that promote critical thinking, reflection, questioning, collaboration, and communication that are critical to academic achievement. This is because the primary purpose of teaching at any level of education is to bring a fundamental change in the learner (Tebabal & Khassay, 2011). As education depends on teaching and learning process, learning depends on the process of instructions. To facilitate the process of instruction in the classrooms,

teachers should apply appropriate teaching strategies that guarantees specific objectives and sustainable achievement. However, questions about the effectiveness of teaching strategies on students' learning and achievement in schools have consistently raised considerable interest in the field of educational research. It is on this observation that we hypothesized that innovative instructional strategies could predict students' academic achievement in English language if properly utilized by the teachers. The innovative instructional strategies in this aspect comprised of technology devices, brainstorming, and inquiry-based learning.

This study sought to explore the impact of these innovative instructional strategies in the classroom teaching and learning. For Example, Anburaji, Christopher Ming (2014) indicated that innovative instructional strategies assist in bringing change in classroom instruction by making them better. In their remark, they indicated that the innovative strategies help to enact, teach conversation, and incorporate creative projects and assignments with the help of multimedia (audiovisual resources). Common innovative language strategies are the ones that integrate technology approach in the teaching process because information and communication technology (ICT) has become essential in school learning contexts.

Using technology devices in the academic institutions has become essential and efficient with digital apparatus such as; laptop computers, tablet and smart phones as part of teaching and learning modern facilities (Mothe,

2018; Ismail, 2016). For example, advances in technology in Australia have influenced the way people create, share, use, and develop information in the society, and young people need to be highly skilled in their use of information and communication technology (Eady & Lockyer, 2013). The primary goal of education is for students to interact and form bonds with the classroom (Ahmad *et al*, 2022). According to Backfisch *et al* (2021) the use of technology devices in the classroom is seen as a substantial innovation in education that will enhance the processes of teaching and learning in the 21st century. Therefore, incorporating technological devices in the teaching process is crucial to assisting students in overcoming challenges like speaking the language of interaction. On these premises, we hypothesize that integrating technology devices in the teaching of English language could positively influence the learning process and predict the students' achievement in the subject domain. Students' proficiency in English language could be actualized when technology devices and other teaching techniques such as such as inquiry-based learning and brainstorming are effectively utilized in the process of instructional delivery.

Vithal, Shama, Subbash, and Ramachandran (2015) indicated that teachers' usage of brainstorming technique provides students with a single stimulus that serves as a clue for a large number of responses. The approach provides a large volume of productive language practice on the part of the students relative to the contribution of

the teacher which allows students to compose utterances at a convenient level (Al-Shmmari, 2015). Fontaine (1981) as cited in the study of Malkawi and Smadi (2018) stressed that brainstorming is a way of bringing ideas without considering their evaluation. This does not mean leaving the evaluation, but only postponing it to the end of the session. The brainstormed should be aware that brainstorming is not guaranteed to get new ideas. That is brainstorming is not just a way to encourage new ideas, but to encourage all participant to contribute to the teamwork.

The nature of brainstorming is characterized as working on the flow of ideas without criticism and tries to speed thinking, break the deadlock, and challenge the minds (Malkawi and Smadi, 2018). This focuses on the positive participation of learners in the educational process, and invites them to build different patterns and images of ideas. It expands student's creative views and opens their minds, during addressing problems, proposing solution, and presenting terminology on the contradictions existing in problem. It is on these observations that we hypothesized that teachers' usage of brainstorming in the teaching process could facilitate students' willingness to get connected with cognitive aspect necessary to understand phenomenon, facts, and concepts that are relevant to achieve academically in English language. On this note, we considered linking technology device, brainstorming with inquiry-based learning in the process of teaching and learning context to see how effective

they could be in influencing students' academic achievement in English language.

The inquiry-based learning demands that students are actively participating in their own learning (Khan *et al*, 2011). Inquiry-based strategies allow for students to interact with their surroundings, ask question, and develop their innate curiosity. This was introduced and effectively implanted in the general secondary teaching methods course at the American university in Dubai (Alain, 2019). In the present study, we elucidate to know if teachers' inquiry-based approach in the instructional delivery has contributed positively to proficiency level of English language of the students. This, we help to understand the extent to which the students had engaged in exploring instructional contents that promote higher order thinking skill and conceptual development, by using inquiry-based learning in the domain of English language. Inquiry is a term used both in education and in daily life to refer to seeking explanations or information by pursuing questions (Harlen, 2013). This an instructional practice where students are at center of the learning experience and take ownership of their own learning by pursuing, investigating, and answering questions (Caswell & LaBrie, 2017). (Spronken-Smith and Walken, (2016), also considered inquiry-based learning as a form of self-directed learning where students take responsibility for their learning. This is in line with the assertion which states that inquiry-based learning is seen as a system of learning that support the development of students' problem-solving and critical

thinking skills (Maxwell, Lambeth, & Cox, 2015). Although, inquiry-based learning is student oriented, Zangori *et al* (2012) *argue* that teachers may direct students at times during the learning process. Guido (2017) examined inquiry-based learning from both the student and the teacher's perspective. Guido's findings explained that from the student's perspective, inquiry-based learning focuses on investigating an open question or problem, while from the teacher's perspective, it focuses on moving students beyond basic curiosity into the realm of critical thinking and understanding. Mackenzie (2016) had classified students' inquiry-based learning into four aspects such as; (1) Structured inquiry, as where students follow the lead of the teacher as the entire class engages on one inquiry together. (2) Controlled inquiry, where the teacher chooses topics and identifies the resources students will use to answer the questions. (3) Guided inquiry, it deals with the teacher chooses topics, and questions, and students design the product or solution. (4) Free inquiry, it is on this aspect that students choose their topics without reference to any prescribed outcomes. It is on these premises that we hypothesized that inquiry-based learning used by both the teachers and students in the learning process could predict students' academic achievement in English language.

Suffice it to say that understanding how the intricate interplay of innovative instructional strategies can facilitate the students' learning and achieving in the English language domain at the secondary school level

has a gap in the knowledge in the academic literature. Despite the continuous efforts exerted by the ministry of Education in Nigeria, represented by all the educational institutions, aimed at improving the quality of the learning process, abysmal results continued to in the domain of English language. Within the framework of the research for finding a way to overcome this phenomenon, the present study reexamines the techniques of teaching that will foster students' positive learning and achievement in English language.

In the context of cultural globalization, English language is acknowledged as one of the most widely used and favored language. Therefore, English language teachers must be aware of innovative techniques in teaching and have confidence in using them in the teaching process. This includes; incorporating technology devices, brainstorming, and inquiry-based learning for the students to achieve academically. In supporting this, assumption, Ojo and Oyeniran (2023) opined that the creation of innovation in educational system in Nigeria is a welcome development. This is necessary because the educational system is not static but rather dynamic. According to the scholars, this dynamism calls for a series of innovative practices from the various stakeholders involved in the educational system in order to make the system better. Teachers are curriculum interpreters at secondary school teaching and they are expected to be innovative to ensure that the school goals and objectives are achieved.

Many studies have examined the impact of innovative instructional strategies on teachers' profession and students' academic achievement. Yawman and Kubi (2016) examined the relationship between teaching approaches and their effect on the performance of students' learning and it showed that the innovative teaching impacted positively on students' performance in sciences. Ojo and Oyeniran (2023) reported that teachers' innovative practices assisted in secondary school students' performance. The study of Simanguntak et al (2019) reported that teaching speaking by applying brainstorming technique, affected the students' speaking achievement in English language. The study of Shalah (2009) which examined the effect of brainstorming in teaching Educational Psychology on both curiosity and performance improvement. It also revealed an improvement on the achievement test among the students. Gholam (2019) revealed that inquiry-based learning approach creates a culture of deep and transferable learning and strengthens student's engagement and allows for differentiation and empowers student's voice and choice. Finally, Edulan *et al* (2025) indicated no significant correlation between teachers' use of technology in institution and students' academic performance in English language. Therefore, identifying the instructional strategies that will facilitate students' intelligence in the demand of English language will help teachers to support their students' proficiency and academic achievement in English language.

Students' academic achievement is a key measure of students' progress in an educational setting. It helps educators to assess students' standing across courses and signals areas for improvement (Edulan *et al*, 2025). Predicting students' academic achievement in English language is vital for optimizing students' academic success in other subject areas. It is on this observation that we presumed that using innovative instructional strategies will serve as an option to strengthen students' achievement in English language. Despite the existence of separate research findings in literature, a comprehensive study that will elucidate the impact of innovative instructional strategies as predictors of students' academic achievement in English language at the secondary school level remained imperative in the Nigerian academic research.

Research Questions

1. To what extent are the assumptions of multiple regression equation for predicting students' academic achievement scores in English language using technology devices, brainstorming, and inquiry-based learning scores met?
2. What is the nature of the regression equation for predicting using technology devices, brainstorming, and inquiry-based learning scores?

3. What are the unique contributions of using technology devices, brainstorming, and inquiry-based learning scores in predicting students' academic achievement scores in English language?
4. Which of the independent variables such as using technology devices, brainstorming, and inquiry-based learning scores best predicted students' academic achievement scores in English language?

Hypotheses

1. The regression equation does not significantly predict students' academic achievement scores in English language using technology devices, brainstorming, and inquiry-based learning scores.
2. The unique contributions of using technology devices, brainstorming, and inquiry-based learning scores do not significantly predict students' academic achievement scores in English language.
3. Using technology devices, brainstorming, and inquiry-based learning scores do not significantly predict students' academic achievement scores in English language.

Research Method

The researchers adopted a predictive correlational design and used questionnaires to collect data for the study. The sample size of our study consists of 1,050 secondary school students in Anambra State. Multi-stage sampling procedure was used to select the respondents. The first stage consisted of randomly sampling 30 secondary schools (five from each education zone) that made up six Education Zones in Anambra State. At the second stage, a simple random sampling technique was used to select 35 students from each secondary school, which resulted to 1,050 students. The study adapted two standardized research questionnaires for data collection. For example, using technology devices was examined with Technology Integration in Instruction Questionnaire (TIIQ) that was developed by Edulan (2025). Teachers' innovative Practices Questionnaire (TIPQ) which was developed by Ojo and Oyeniran (2023) was used for brainstorming and inquiry-based learning. Participants were directed to rate the support provided by each source on six different items using a scale of six-point rating from Very Untrue (VU) = 1, Mostly Untrue (MU) = 2, Somewhat Untrue (SU) = 3, Somewhat True (ST) = 4, Mostly True (MT) = 5, and Very True (VT) = 6. The students' achievement scores were obtained from the schools before the start of the administration of the other two questionnaires. The achievement scores used in the study were the results of the state wide SS1 promotion examination in English language.

The methods used for validating the instruments were face and construct validity by the three experts from the Faculty of Education, Nnamdi Azikiwe University Awka. Cronbach's alpha reliability method was used to determine the internal consistency of the items in the research questions and 0.71, 0.82, and 0.73, 0.79 were obtained for using technology devices, brainstorming, and inquiry-based learning respectively. The data were analyzed using standard multiple regression analyses. Research question 1 was answered using multiple regression equation. Research question 2 was answered using sub standardized β . Research question 3 was answered using adjusted R^2 . Research question 4 was answered using sub standardized β . Hypothesis 1 was tested F-test for regression model. Hypothesis 2 was tested using t-test for adjusted R^2 . at .05 alpha level significance while hypothesis 3 was tested using t-test for β . Then, using multiple regression tools for investigating the study is significant because it is convenient to examine the relationships between multiple variables by relating one variable to a set of variables. This helped to identify the effect of one variable while adjusting for other observable differences. The decision rule for research questions was that the proportion for variable that is below 10% is low, 11% to 30% is moderate, 31% to 50% is high while 51% and above is considered very high according to Cohen's d (1988) statistics guideline. The decision rule was to accept the null hypotheses if the p-value was greater than 0.05 level of significance ($p > 0.05$) and reject the null hypotheses if the p-value was less than 0.05 level of

significance ($p < 0.05$). Also, Reject the null hypotheses if the p-value was equal to 0.05 level of significance ($p = .05$).

Results

Presentation of Results

The data were first screened for missing values, and 193 respondents had missing values representing 18.38%. Hence likewise deletion approach was adopted. After deleting the 193 respondents, the sample size was reduced to 857. Thereafter, analysis of the study was carried out using standard multiple regression analysis with SPSS 25.

Research question 1: To what extent are the assumptions of the regression equation for predicting students' academic achievement scores in English language using their technology devices, brainstorming, and inquiry-based learning scores met?

Table 1: Correlation and descriptive statistics of independent and dependent variables in the regression model for this study (N = 857).

Variables			TD		B		IBL	ACHX	SD	VAR
SK	KU	TF	VIF							
TD	1	20.47	3.76	14.16	-.244	.768	.942	1.062		
B	.236**	1	20.41	3.80	14.46	.072	1.333	.939	1.065	
	.000									
IBL	-.070*	-.090*	1	20.62	3.70	13.69	.227	-.427	.989	

1.011	.040	.008					
ACH.084*	.065	.097**	1	58.389.5090.27	.241	.041	
.....	.014	.056	.005				

Std. Residual Min = -3.05, Std. residual Max = 3.762, Durbin Waston statistics = 2.011. TD = Technology Devices, B = Brainstorming, IBL = Inquiring-Based Learning, and ACH = Academic Achievement.

Fig 1 the normal P.P plot of standardized residuals data points of students' academic achievement.



Fig 1 the normal P.P plot of standardized residuals data points of students' academic achievement.

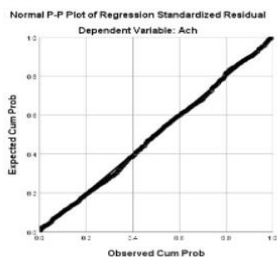


Fig 2 the normal distribution curve of standardized residuals data points of students' academic achievement.

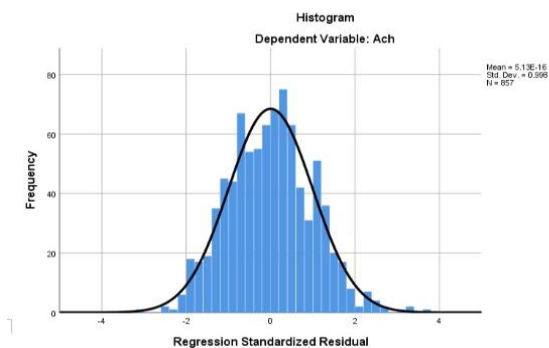
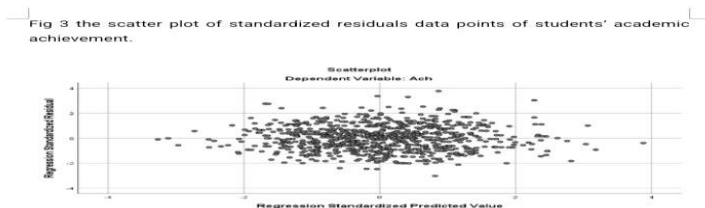


Fig 3 the scatter plot of standardized residuals data points of students' academic achievement.

Fig 3 the scatter plot of standardized residuals data points of students' academic achievement.



To answer research question 1, seven assumptions of multiple linear regression were tested in this study. First, the assumptions of normality of the data were tested using Skewness and Kurtosis. The assumptions were made since none of the Skewness and Kurtosis values of each of the variables do not exceed + 3 and – 3 as recommended. Second, the assumptions of absence of multivariate outliers were checked using standardized residual statistics and Cook's distance statistics (1977). Result of standardized residual values indicated that the (Std, Residual Min = -3.025, Std, Residual Max = 3.762). It lies between -3 to 3 as recommended by (Tabachnick and Fidell, 2018). While the result of the Cook's distance shows a maximum value of .031 which is less than 1 as recommended by (Cook, 1977). Hence, the assumptions of absence of multivariate outliers were not violated. Third, the assumptions of absence of multi-co linearity among the predicting variables were checked using Variance Inflated Factor (VIF), and Tolerance Factor (TF). The Tolerance Factors and Variance

Inflated Factors (Technology Devices, $TF = .942$, $VIF = 1.062$, Brainstorming, $TF = .939$, $VIF = 1.065$; Inquiry-Based Learning, $TF = .989$, $VIF = 1.011$ of the independent variables show that the values were less than 10 for Variance Inflated Factor and greater than .20 for Tolerance Factor respectively as recommended by (Schumaker, 2015). Hence, this assumption of absence of multicollinearity was made. Fourth, the assumption of independent of error was tested using Durbin Waston statistics. The result shown a Durbin Waston statistics of .951 is less than 3 but greater than 0 as recommended by (Denis, 2020). Hence, the assumption of independent of error was not violated. Fifth, the assumptions of normality of error distribution were tested using normal P.P plot of standardized residual. Figure 1 shows that the normal P.P plot of standardized residual data points were normally distributed. Histogram of the standardized residual in figure 2 also testified to that. Sixth, the assumption of homogeneity of variance and linearity was tested using scatter plot of standardized predicted values. The result in figure 3 shows that the data met the assumption of homogeneity of variance and linearity as the predicted values were distributed above zero in both dimensions and do not show any pattern. Seventh, the assumptions of non-zero variance were tested using variance statistics and the data also met the assumptions of non-zero variances (Technology Devices, Variance = 14.16; Brainstorming, Variance = 14.46; Inquiry-Based Learning, Variance = 13.69; Academic Achievement, Variance = 90.27) as there is no zero

variance for the variables in the study as shown in the table 1.

Research Question 2: What is the nature of the regression equation for predicting students' academic achievement scores in English language using technology devices, brainstorming, and inquiry-based learning scores?

Table 2: Regression coefficient for technology devices, brainstorming, and creative inquiry-based learning scores (N = 857).

Model	Standardized beta	Unstandardized beta	Std. Error
Constant		45.764	3.021
Technology devices	.198	.088	.078
Brainstorming	.141	.087	.056
Inquiry-based learning	.276	.087	.107

Using the information in table 2, the nature of the regression equation for predicting students' academic achievement scores in English language using technology devices, brainstorming, and inquiry-based learning scores follows:

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3$$

$$Y = 45.764 + .198x_1 + .141x_2 + .276x_3$$

$$ACH = 45.764 + 0.198 + 0.282 + 0.819$$

$$ACH = 45.764 + 0.198TD + 0.282B + 0.819IBL$$

TD = Technology Devices, B = Brainstorming, IBL = Inquiry-based learning. The equation shows that for every unit increase in student's technology devices, students' achievement in English language increased by 0.198. For every unit increase in brainstorming, students' achievement in English language increased by 0.282. For every unit increase in inquiry-based learning, students' achievement in English language increased by 0.819. The implication of these findings is that these innovative instructional strategies have positively influenced the students' desire to engage in the learning process of English language.

Research Question 3: What are the unique contributions of students' technology devices, brainstorming, and inquiry-based learning scores in predicting their academic achievement scores in English language?

Table 3: Regression model summary of technology devices, brainstorming, and inquiry-based learning scores in predicting their academic achievement scores in English language (N = 857).

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate
	.144 ^a	.021	.017	9.41876

To answer this research question, the adjusted multiple regression R square was used. The result of study shows that using students' technology devices, brainstorming, and inquiry-based learning scores yielded an adjusted R squared of .017. This implies that predictors accounted for about 1.7% of the variance in students' academic achievement scores in English language.

Research Question 4: Which of the independent variables such as, students' technology devices, brainstorming, and inquiry-based learning scores best predicted their academic achievement scores in English language?

Table 4: Regression coefficient for predicting students' academic achievement scores in English language using their technology devices, brainstorming, and inquiry-based learning scores (N = 857).

Model		Unstandardized β	Std. Error
Standardized β			
Constant	45.764	3.021	
Technology devices	.198	.088	.078
Brainstorming	.141	.087	.056
Inquiry-based learning	.276	.087	.107

Table 4: Regression coefficient for students' academic achievement scores in English language scores using their technology devices, brainstorming, and inquiry-based learning scores. To answer this research question

4, the standardized regression coefficient (β) in table 4 was used for comparison. The regression coefficients presented in table 4 shows unstandardized (β) and standardized regression coefficient (β) for technology devices scores are .198 and .078. For brainstorming scores are .141 and .056. For inquiry-based learning are .276 and .107. Using the standardized (β) for comparison, students' inquiry-based learning mostly predicted academic achievement scores in English language as shown by the β of .276. Students' technology devices are the second most predicted academic achievement scores in English language as shown by the β of .198. Students' brainstorming is the third mostly predicted academic achievement scores in English language as shown by the β of .141 respectively.

Hypothesis 1: The regression model does not significantly predict students' academic achievement scores in English language.

Table 5: F- test for regression model of technology devices, brainstorming and inquiry-based learning scores (N = 857).

Model Sig.	Sum of Squares	Df	Mean Square	F
Regression	1598.490	3	532.830	6.006
Residual	75672.208	853	88.713	.000 ^b
Total	77270.698	856		

The analysis of variance in the table 5 shows that the regression equation was significant $(3, 853) = 6.006, p < .05$. This implies that at least one of the independent variables significantly predicted students' academic achievement scores in English language.

Hypothesis 2: The unique contributions of students' technology devices, brainstorming, and inquiry-based learning scores to predict their academic achievement scores in English language is not statistically significant.

Table 6. t-test of adjusted R square of the regression model for this study (N = 857).

Model	R	R- Square	Adjusted	Std. Error	t – cal for	DF	t-
crit.	Remark		R- Square	Estimate	adj. R ²		
1.960	.144 ^a S	.021	.017	9.418776	4.300934	855	

To test hypothesis 2, t-test for adjusted R square was conducted. Results of the study shown in table 6 indicate that t-critical for adjusted R square is 1.960 while that of the t-calculated is 4.300934. Since the t-calculated for adjusted R square 4.300934 is greater than t-critical 1.960, the null hypothesis which states that the unique contributions of students' technology devices, brainstorming, and inquiry-based learning scoresto predict their academic achievement scores in English language is not statistically significant is rejected and the

alternative hypothesis is accepted. In other words, the unique contributions of students' technology devices, brainstorming, and inquiry-based learning scores to predict their academic achievement scores in English language is statistically significant. The implication of these findings is that the perceptions students have toward the teachers' utilization of technology devices, brainstorming, and inquiry-based learning in the instructional delivery contributed significantly to their English language proficiency. Effect sizes were also evaluated using adjusted R^2 comparing it with Cohen's d statistics guideline, where $d < 0.20$ indicates a minimal effects size, $0.20 < d < 0.50$ indicates a small effect size, $0.50 < d < 0.80$ indicates a moderate effect size and $d > 0.80$ indicates a large effect size. The value of R adjusted square .021 indicates a small effect size.

Hypothesis 3: Students' technology devices, brainstorming, and inquiry-based learning scores do not significantly predict their academic achievement scores in English language.

Table 7: t-test of regression coefficient of students' academic achievement scores in English language using their technology devices, brainstorming, and inquiry-based learning scores (N = 857).

Model none	standardized β	Std. Error	Standardized β	T	P-value
Remark					
Constant	45.764	3.021		15.149	.000
S					
Technology devices	.198	.088	.078	2.246	.025

S					
Brainstorming	.141	.087	.056	1.611	.107
NS					
Inquiry-based learning	.276	.087	.107	3.154	.002
S					

Table 7 shows that using technology devices and inquiry-based learning scores by the teachers significantly predicted students' academic achievement scores in English language since their p-values are smaller than .05. While brainstorming strategy used by the teachers does not significantly predict their academic achievement scores in English language since their p-values are greater than .05. This shows that students are more adaptive in using technology devices, and inquiry-based learning than brainstorming strategy in the teaching and learning process.

Discussion of findings

The findings from the study indicated that the seven assumptions that were tested did not violate the statistical guides being consulted in the process of checking them. This shows that teachers' innovative instructional strategies have had positive impact on students which make them to adapt with those strategies in their learning of English language. It means that when teachers effectively utilized technology devices, brainstorming, and inquiry-based learning to be students centered in their teaching process, students' desire to develop high level of mastery on English language domain that involves reading, writing, and speaking

proficiency will be enhanced. In the study, it was indicated that the relationship among using technology devices, brainstorming, and inquiry-based learning in teaching students relatively recorded a low and moderate significant relationship with students' academic achievement in English language. This indicates that English language teachers must take cognizance of the impactful roles of these innovative instructional techniques and utilized them effectively in the teaching process. This finding supported the study of Ojo and Oyeniran (2023) which reported that teachers' innovative practices assisted in secondary school students' performance. This finding did not supported the study of Edulan *et al* (2025) which indicated no significant correlation between teachers' use of technology in institution and students' academic performance in English language.

The findings from the result revealed that on the nature of regression equation, technology devices, brainstorming and inquiry-based learning had contributed positively to the predicting model. This shows that when teachers are positively using these innovative instructional strategies in the teaching process, the positive impacts will increase the chances of achieving academically by the students. These supported the study of Simanguntak *et al* (2019) which reported that teaching speaking by applying brainstorming technique, affected the students' speaking achievement in English language. The findings also supported study of Shalah (2009) which examined the effect of

brainstorming in teaching Educational Psychology on both curiosity and performance improvement, as Shalah's study revealed an improvement on the achievement test among the students.

Findings from the study also indicate that the independent variables have intricate roles to play on students' academic achievement in English language. In the present study it was revealed that technology devices and inquiry-based learning significantly predicted students' academic achievement in English language, while brainstorming did not significantly predict students' academic achievement in English language. This was supported by the study of Gholam (2019) which revealed that inquiry-based learning approach, creates a culture of deep and transferable learning and strengthens student's engagement and allows for differentiation and empowers students voice and choice. Finally, these findings were supported by the study of Yawman and Kubi (2016) examined the relationship between teaching approaches and their effect on the performance of students' learning and it showed that the innovative teaching impacted positively on students' performance in sciences.

Conclusion

From the findings in the study, it was interesting to unveil that teachers using technology devices, brainstorming, and inquiry-based learning in the teaching process significantly predicted students' academic achievement in English language.

Conclusively, it was found in the present study that the regression model of using technology devices, brainstorming, and inquiry-based learning was positively significant.

Recommendations

Based on the findings, the following recommendations were made:

1. One of the most prominent recommendations was to refer to those concerned in the educational process, especially in the field of teaching English language, where the study sheds light on the use of technology devices, brainstorming, and inquiry-based learning and how to benefit from it by the students to narrow the gap resulting from traditional practices in the teaching of English language. This is to reach the objective results that reflect the pedagogical and educational reality regarding the level of students' achievement in the English language proficiency.
2. It was also recommended that students should utilize technology devices, brainstorming, and inquiry-based teaching and learning strategies in the learning of English language in the classroom so as to increase their interest and achievement in the English language proficiency.

References

- Ahmad, I. Deeba, F., & Rehman, K.U. (2012). Teachers' perspectives on strategies for effective classroom management. *A qualitative Inquiry Research Journal of Social Sciences and Economics Review*, 3(4), 73-85.
- Alain, G. (2019). Inquiry-based learning: Student Teachers' Challenges and Perceptions. *Journal of Inquiry and Action in Education*, 10(2).
- Alameddine, M.M., & Ahwalb, H.W. (2016). Inquiry based teaching in literature classrooms. *Procedia-Social and Behavioral Science*, 232, 332-337.
- Al-Shammari, M.K. (2015). Effective brainstorming in teaching social studies for elementary school. *American International Journal of Contemporary Research*, 5(2), 60-65.
- Anburaj, M.G, Christopher, G., & Ming, N. (2014). Innovative methods of teaching English language. IOSR. *Journal of Humanities and Social Science*, 19(8), 62-65.
- Backfisch, I., Lachner, A., Sturmer, K. & Scheifer, K. (2021). Variability of teachers' technology integration in the classroom: A matter of utility. *Computers & Education*, 166, 104159.
- Caswell, C.J., & LaBrie, D.J. (2017). Inquiry-based learning from the learner's point of view: A Teacher Candidate's Point of Story. *Journal Humanistic Mathematics*, 7(2), 161-186.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. New York, NY: Routledge

Academic.

- Cook, R.D. (1977). Detection of influential observations in linear regression. *Technometrics*, American Statistical Association.
- Denis, D.J. (2020). *Univariate, Bivariate and Multivariate Statistics Using R: Quantitative Tools for Data Analysis and Data Science*. India: Wiley Publication.
- Eady, M.J. & Lockyer, L. (2013). *Tools for learning: technology and teaching strategies*. Learning to teach in the primary school. Queens land University of Technology, 71.
- Eduhan, J.M.R., Galvan, N.G., Yanguang, K.Q.E., Cbarin, A.S. & Valleja, J.H (2015). The use of technology in instruction, students' learning styles, and their academic performance in English. *International Journal of Research and Innovation in Science*, IX (1), doi:10.47772/IJRISS.2025-9010209.
- Gholam, A. (2019). Inquiry-based learning: Student Teachers' Challenges and perceptions. *Journal of Inquiry and Action in Education*, 10(3), 112.
- Gruido, M. (2017). Inquiry-based Learning Definition, Benefits and Strategies. Retrieved October 26, 2017, from <https://wwwprodigyane.Com/blog/inquiry-based-learning-definition-benefits-strategies/>
- Ismail, A. (2016). The impact of information communication and technology on students' academic performance. Evidence from Indonesia

- EFL classrooms. *International Journal of Indonesian Students*, 1(7), 120-130.
- Khan, M.S., Hursain, S., Ali, R., Menoka, M.I., & Ranizan, M. (2011). Effect of inquiry method on achievement of students in chemistry at secondary level. *International Journal Academic Research*, 3(1) 955-959.
- Mackenzte, T. (2016). *Dive into Inquiry: Amplify learning and empower student voice*. California: Education Technology Press.
- Malkawi, N.A.M & Smadi, A (2018). The effectiveness of using brainstorming strategy in the development of academic achievement of six grade students in English Grammar at public schools in Jordan. *International Education Studies*, 11, No. 13.
- Maxwell, D.O., Lambeth, D.T., & Cox, J.T. (2015). Effects of using inquiry-based learning on science achievement for fifth-grade students. *In Asia-Pacific Forum on Science Learning and Teaching*, 16(1),5-35.
- Moths, P.S. (2018). *Innovative technology as of teaching vocabulary at the intermediate level in the second language classroom*.
- Ojo, O.J. & Oyeniren, S. (2023). Teachers' innovative practices and secondary school students' academic performance in the era of Covid-19 pandemic in Ilorin Metropolis of Kwara State. *International Journal of Innovation in Teaching and Learning (IJITL)*, 9(2), 61-72.
- Sack,C.,& Kuado, J. (2017). Effectiveness of Brain-

Based Learning Strategy on Students' Academic Achievement, Attitude, Motivation and Knowledge retention in Electrochemistry.

Journal of Education, Society and Behavioural Sciences, 21(3), 1-13.

Samanjutak, S.R.H., Sinambelar, F., & Labis, P.S. (2019). The effect of role-play and brainstorming teaching on students' speaking achievement. *Cetta Jurnal Thina Pendidikan*, vol, 2(3).

Schumacher, R.E. (2015). Using R with multivariate statistics. A premier. London: Sage Publication.

Shalah, G. (2009). The effect of brainstorming in teaching educational psychology on both curiosity and performance improvement in psychological test with higher mental level in Saudi Arabia. *Journal of Education*, 19(79), 228-256.

Shotoyeke, A.D. (2014). The impact of teaching method on preprimary pupils learning achievement in protection issues in selected nursery and primary schools in Ondo West local Government. *Journal of elementary Education*, 25 (2), 45-60.

Spronken-Smith, R., & Walker, R. (2011). Can inquiry-based learning strengthen the links between teaching and disciplinary research? *Studies in Higher Education*, 35(6), 723-740.

Tabachnick, G.B., & Fidell, L.S. (2018). Using multivariate statistics. New York: Pearson.

Tebabal, A. & Kehesay, G. (2011). The efforts of student-centered approach in improving

- students' graphical interpretation skills and conceptual understanding of kinematical motion. *Latin-American Journal of Physics Education*, 5(2), 9.
- Van, L.K., Dang, T.A., Pham, D.R.T., Vo, T.T.N, & Pham, V.P.H. (2021). The effectiveness of using technology in learning English. *Asia CALL Online Journal*, 12(2), 24-40.
- Vithal, P.C., Subbash, A.R., Shama, B.R., & Ramachandran, M. (2015). Emerging trends and future prospects of medical tourism in India. *Journal of Pharmaceutical Sciences and Research*, 7(5), 248.
- Yawman, M., & Appiah-Kabi, J. (2018). Innovative-teaching strategies and students' achievement. <https://dx.doi.org/102139/90m.3161988>.
- Zangori, L., Forbes, C., & Bigger. M. (2012). Is this inquiry-right? Strategies for effectively adapting elementary science lesson. *Science and Children*, 50(1), 48-53.