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Effect of Jigsaw Teaching Approach on Students' Academic Achievement in Business Education Practicum

A Case Study in Colleges of Education, South East Nigeria

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ABSTRACT

This study focused on the effect of jigsaw teaching approach on students' academic achievement in business education practicum in colleges of education South-East, Nigeria. Two research questions guided the study while three hypotheses were tested. The study adopted quasi experimental research design of pretest, post-test non-randomized group. The study area is South-East Nigeria. The population of the study comprised 155 Business Education NCE II students from the seven colleges of education in South-East, Nigeria. The sample of the study is 67 NCE II Business Education students from two colleges of education in South-East, Nigeria. A Business Education Practicum Achievement Test (BEPAT) was developed by the researchers as to enable them collect data for the study. The instrument was validated by experts and subsequently administered to the 67 respondents used for the study. The administered test instrument were retrieved, marked and scored and the scores used for analysis. The items with regards to research questions were analyzed using mean and standard deviation while alternative hypotheses were tested at 0.05 level of significance using Analysis of Covariance. Findings of the study revealed that teaching and learning business education practicum using jigsaw teaching approach improve students' academic achievement. Result of the hypotheses shows that there was no significant difference between the academic achievement of male and female NCE II students in business education practicum. Findings on the interaction effect of teaching approaches and gender indicates that gender

interact to affect students' achievement in business education practicum. The researcher concluded that jigsaw teaching approach is effective in improving students' achievement in business education practicum irrespective of gender.

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Keywords
Academic Achievement
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Introduction

The traditional/conventional approaches which have been used in the past for classroom teaching have failed to promote teaching/learning adequately. According Ref. [1], the traditional method of teaching is defective in enhancing students academic achievement in different school subjects. In support to this, Ref. [2] pointed out that traditional education practices such as demonstration and lecture method alone have proved incapable of producing skills required for coping with the challenge posed by rapid technological development. The learner-centred or modern approaches to teaching and learning are innovative methods and techniques that encourage student's interest and participation in the learning process.

Ref. [3] view the learner-centred method as a method whereby students are opportuned to participate actively in the teaching-learning process while the teacher plays a more passive role. Unlike the conventional method which promotes rote or memory learning, the modern approach is interactive, task-based and learner-centred. The modern view sees teaching as a method of helping learners to construct, form or reconstruct knowledge based on personal experience from activities or interaction with individual and materials within the learning environment. Thus, the modern teaching approach is learner-centred, learner-friendly with activity-based teaching methods which are used to get learners fully involved in the teaching and learning process

Among the active learning approaches is Jigsaw teaching approach. Jigsaw teaching approach is one of the modern teaching approaches which ensure the active participation of learners. Jigsaw teaching approach is a cooperative learning strategy designed to reduce racial conflict and increase positive educational outcomes such as improved test performance, reduce absenteeism and increase students' interest in classroom activities [4]. Students are provided the opportunity to become experts in a particular subject and share that knowledge with their peers. This approach promotes both self and peer teaching which requires students

to understand the material at a deeper level and engage in discussion, problem-solving and learning [5].

Business education is concerned with teaching the skills, attitudes and knowledge needed for a successful business career. According to Ref. [6] business education is a vocational discipline that prepares its recipients with skills that will enable them to contribute significantly to the economic development of a nation. Buttressing more, Ref. [7] defined business education as an education for the acquisition and development of skills and competencies, attitudes and attributes which are needed for efficiency of the economic system. They further stressed that it is the intellectual and vocational preparation of students for earning a living in the contemporary industrial and business environment and for self employment. Ref. [8] maintained that it is a fusion of pedagogical and entrepreneurial preparation. He further states that it involves the study of technologies and related sciences and the acquisition of practical skills (including teaching skills) attitudes, understanding and knowledge related to occupation in various sectors of the economy and social life. To ensure that the recipient of business education acquire these desirable skills, courses covering areas such as office technology, accounting, marketing, management and administration and entrepreneurship are enshrined in the business education curriculum.

Business education courses are wide array of courses that are meant to equip students of various ages with the fundamental principles of business. Among the numerous courses in NCE business education, include business education practicum. Business education practicum is designed to assist business education students gain better understanding of the necessary practical skills to acquire which enable them to teach business education in schools and as well function effectively in the work place. Owing to this, the need to adopt a teaching method that will get them fully involved becomes necessary. Providing learners the opportunity of being actively involved in the teaching and learning process will lead to better academic achievement.

Academic achievement is the level attained by a learner in some general or specific area of learning, which is quantified by a measure of the student's academic standing in relation to those of other students who were exposed to the same learning experiences. According to Ref. [9] academic achievement involves observable and measurable performance of students that take place in the presence of a standard for measuring academic excellence. For students to have better academic achievement, there must be retention of what had been learnt.

Retention is the process of transferring new information into long-term memory. This means the individual have effectively taken in the information and is able to recall it in future. Ref. [10] defined retention as ability to store facts and remember things easily. Learners irrespective of gender retain what they learnt when an appropriate teaching approach is adopted.

The teaching approach adopted to teach any course has a direct and consequential effect on the students' achievement in that course. The use of rote rather than task based learning has led to the production of students who are not well equipped to face the world of work. The adoption of conventional lecture method by lecturers of business education is largely responsible for the high level anxiety and failure expressed by their students. The challenge of poor academic achievement and retention witnessed in business education practicum calls for concern. Despite efforts made by Heads of Department by assigning the course to specialists in office education rather than allowing every lecturer of business education to teach the course, the course has continued to witness low achievement by students. This may be as a result of traditional method of teaching use by the lecturers. This situation is rather worrisome. This is because the students may not be well equipped to face the world of work of today when the course was enshrined in the curriculum of business education to prepare students for the work place of now. The problem of this study therefore is that academic achievement of NCE students in business education practicum has been persistently poor and if nothing is done to reverse this ugly trend achieving the objective of the course will be difficult. It is assumed that jigsaw teaching approach will produce a better learning outcome for students of business education practicum but this need to be determined empirically hence the study on effect of jigsaw teaching approach on students' academic achievement in business education practicum in colleges of education, South-East, Nigeria.

A. Research Questions

The following research questions guided the study:

- What are the pretest and post test achievement mean scores of NCE II students taught business education practicum using jigsaw teaching approach and those taught with lecture method in Colleges of Education in South-East Nigeria.
- What are the mean achievement scores of male and female NCE II students taught Business Education Practicum using Jigsaw teaching approach and those taught with lecture method in Colleges of Education in South-East, Nigeria?

B. Hypotheses

The following alternative hypotheses were tested at 0.05 level of significance.

- There is significant difference between the mean achievement scores of students taught Business Education Practicum using Jigsaw teaching approach and those taught with lecture method in Colleges of Education in South East, Nigeria.
- There is significant difference in the mean achievement scores of male and female students taught Business Education Practicum using Jigsaw teaching approach and those taught with lecture method in Colleges of Education in South East, Nigeria.

- There is significant interaction effect of the teaching approaches (Jigsaw approach and lecture method) and gender on NCE students' mean achievement scores in business education practicum in Colleges of Education in South East, Nigeria.

Material and Methods

The study adopted the pre-test, post-test, non-equivalent control group quasi-experimental design. The research design is considered suitable because it allows the researcher to observe the achievement of students before and after manipulation of the independable variable. The study was conducted in South-East, Nigeria. The population of this study comprises 155 NCE II business education students in Colleges of Education in South East. The sample size was 67 NCE II business education students from two colleges of education in South-East Zone. From the experimental school, the intact of 26 (8 males and 18 females) was used and from the control school, an intact class of 41 (12 males and 29 females) was used. The instrument used for data collection was Business Education Practicum Achievement Test (BEPAT) with 40 multiple choice objective test questions with four options which covers contents in business education practicum. The researcher used the questions during the pre-test and the same questions were reshuffled and used as post-test. The BEPAT was validated by three experts, one from the department of Technology and Vocational Education, the other from Science Education and another from the department of Measurement and Evaluation, all in Nnamdi Azikiwe University, Awka. The reliability of BEPAT was established by administering it on NCE II business education practicum students in Delta State College of Education (Tech) Asaba, which is outside the research area but has a homogenous culture as the research area. The scores obtained from trial testing exercise were used to estimate the reliability co-efficient of BEPAT using Kudar Richardson formular (KR-20) which yielded a reliability index of 0.83. To determine the equivalent forms reliability of the two forms of test the pearson correlation was used to obtain the reliability coefficients for test I and 2 which is 0.795. Before the experimental, pre-test was administered to all the NCE II business education practicum students, experimental and control groups.

The treatment procedures used for the study are as follows:

- Permission was obtained from the heads of the department of the two colleges of education involved in the study
- Pre-test was administered for both experimental and control group. The scores for both experimental and control group were collated and recorded.

- The experimental group was taught business education practicum using jigsaw teaching approach while the control group was taught the business education practicum using lecture method.
- The experiment lasted for two weeks. Errors made by the students were corrected and necessary precautions were observed.
- Post-test was administered for the two groups and the results were collated and recorded for analysis.

Data obtained were analyzed with the descriptive statistics of mean to answer the research questions while standard deviation was used to ascertain the homogeneity or otherwise of the respondents' achievement scores. Analysis of covariance (ANCOVA) was used to test the alternative hypotheses at 0.05 alpha level.

Results

Data presentation in Table 1 depicts the pretest and posttest mean achievement scores of students taught Business Education Practicum using jigsaw teaching approach and those taught with lecture method.

Table 1. Pretest and Posttest Mean Achievement scores and standard deviation

Group	N	Pretest		Posttest		Gain
		Mean	SD	Mean	SD	
Experimental	26	10.12	1.451	25.85	2.767	15.73
Control	41	9.37	2.385	18.29	1.927	8.92
Difference	67	0.75		7.56		6.81

The table shows mean scores of pretest for the experimental group (M = 10.12) and the control group (M = 9.37). Similarly, the table shows the mean scores of posttest for the experimental group (M = 25.85) and the control group (M = 18.29). The table further shows the mean gains for the experimental group (M = 15.73) and the control group (M = 8.92), which indicates that the experimental group has higher mean gain than the control group with a difference of 6.81.

Data presentation in Table 2 show the mean retention scores of male and female students taught Business Education practicum using jigsaw teaching approach and those taught with lecture method.

Table 2. Pretest and Posttest Mean Retention scores and standard deviation

Group	N	Pretest		Posttest		Gain
		Mean	SD	Mean	SD	
Experimental	20	9.65	1.424	20.70	3.962	11.05

Control	47	9.66	2.334	21.45	4.524	11.79
Difference	67	0.01		0.75		0.74

The table reveals mean scores of pretests for the male students (M = 9.65) and the female students (M = 9.66). The table also shows the mean scores of posttests for the male students (M = 20.70) and the female students (M = 21.45). The table further reveals the mean gains for the male students (M = 11.05) and the female students (M = 11.79). The mean gains depict that the female students have higher mean gain than the male students with a differences of 0.74.

A. Hypothesis 1

There is significant difference between the mean achievement scores of students taught Business Education Practicum using Jigsaw teaching approach and those taught with lecture method in Colleges of Education in South East, Nigeria.

Table 3. ANCOVA Summary of Teaching Approaches

Sources	Type III sum of squares	df	Mean square	F	Sig	Partial Eta Squared	Decision
Corrected Model	932.997a	2	466.499	94.888	.000	.748	
Intercept	1034.484	1	1034.484	210.418	.000	.767	
Pretest	25.228	1	25.228	5.131	.027	.074	
Group	828.094	1	828.094	168.438	.000	.725	Significant
Error	314.645	64	4.916				
Total	31428.000	67					
Corrected Total	1247.642	66					

The results of Table 3 depict the test of the difference in academic achievement mean scores of students taught Business Education practicum using Jigsaw teaching approach and those taught with lecture method. The result shows a significant difference between the academic achievement mean scores of students taught practicum with jigsaw teaching approach and those taught with lecture method: $F(1, 64) = 168.438$, $p = .000$ with an effect size of 0.725 (72.5%). This outcome reveals that the alternative hypothesis is rejected. Hence, there is a significant difference in the academic achievement mean scores of students taught Business Education practicum with jigsaw teaching approach and those taught with lecture method.

B. Hypothesis 2

There is significant difference in the mean achievement scores of male and female students taught Business Education Practicum using Jigsaw teaching approach and those taught with lecture method in Colleges of Education in South East, Nigeria.

Table 4. ANCOVA Summary of Teaching Approaches on Male and Female Students' Mean Achievement Scores

Sources	Type III sum of squares	df	Mean square	F	Sig	Partial Eta Squared	Decision

Corrected Model	112.608a	2	56.304	3.175	0.48	0.90	Not Significant
Intercept	684.491	1	684.491	38.596	.000	.376	
Pretest	104.783	1	104.783	5.908	.018	.085	
Gender	7.7.04	1	7.704	.434	.512	.007	
Error	1135.034	64	17.735				
Total	31428.000	67					
Corrected Total	1247.642	66					

Table 4 shows the test of the difference in academic achievement mean scores of male and female students taught Business Education practicum using Jigsaw teaching approach and those taught with lecture method. From the table, it shows that there is no significant difference between the academic achievement mean scores of male and female students taught practicum with jigsaw teaching approach and those taught with lecture method: F(1, 64) = 0.434, p = 0.512 with a non-significant effect size of 0.007 (0.7%). This outcome reveals that the alternative hypothesis is retained. Hence, there is no significant difference in the academic achievement mean scores of male and female students taught Business Education practicum with jigsaw teaching approach and those taught with lecture method.

C. Hypothesis 3

There is significant interaction effect of the teaching approaches (Jigsaw teaching approach and lecture method) and gender on NCE students' mean achievement scores in business education practicum in Colleges of Education in South East, Nigeria.

Table 5. ANCOVA of the Interaction Effect of Teaching Approaches and Gender on Achievement Scores

Source	Type III sum of squares	df	Mean square	F	Sig	Partial Eta Squared	Decision
Corrected Model	943.031a	4	235.758	47.986	.000	.756	Not Significant
Intercept	1007.638	1	1007.638	205.093	.008	.768	
Pretest	25.349	1	25.349	5.160	.027	.077	
Group	614.397	1	614.397	125.053	.000	.669	
Gender	4.112	1	4.112	.837	.364	.013	
Group Gender	8.347	1	8.347	1.699	.197	.027	
Error	304.611	62	4.913				
Total	31428.000	67					
Corrected Total	1247.642	66					

The results of Table 5 depict the test of the interaction effects of method (Jigsaw teaching approach and lecture method) and gender (male and female) in the academic achievement mean scores of students taught Business Education practicum. The result shows no significant interaction effects of methods and gender on the students' academic achievement mean scores: F(1, 64) = 1.699, p = .197 with an effect size of 0.027 (2.7%). This outcome reveals that the alternative hypothesis is retained. Hence, there is no significant interaction effects of method and gender in the academic achievement mean scores of students taught Business Education practicum.

Discussion

Research question one sought to determine the effect of Jigsaw teaching approach on academic achievement of NCE II business education students in business education practicum. The findings of this study shows that the effect of Jigsaw teaching approach on students academic achievement in business education practicum were significantly higher than the effect of lecture method. The higher level achievement by the experimental group could be as a result of high level of interaction amongst group members during the treatment.

The present finding is in line with earlier results of findings of Ref. [11] whose findings revealed that Jigsaw teaching strategy significantly enhance achievement and retention of students in chemistry more than the conventional teaching method. The findings also corroborated with the reports of Ref. [12] which revealed that Jigsaw learning strategy was more effective for teaching basic science than conventional strategy. Their findings also revealed that in Jigsaw teaching approach, the students are actively involved in the experimental learning.

Furthermore, in support of Jigsaw effectiveness, Ref. [13]-[15] revealed that Jigsaw strategy had more positive effect on students' overall mathematics achievement than the lecture method. the reason for these could be because these group of students were always engaged during the lectures, got involved in discussions, asked and answered questions. Thus they had indepth understanding of the various topics discussed during the interaction.

Research question two sought to find out the effect of Jigsaw teaching approach on academic achievement of male and female NCE II students in business education practicum. The findings emanating from this study shows that teaching and learning business education practicum using Jigsaw approach improve female students' academic achievement in business education practicum than their male counterpart. The mean scores of female students is higher than those of male students in other words, teaching business education practicum using Jigsaw teaching approach proved to be more effective in female students. The findings of this study is in line with earlier findings by Ref. [16], [17] which revealed that female students achieved better than their male counterparts after they were exposed to Jigsaw strategy in biology class.

The result is also akin to the findings of the study by Ref. [18] which revealed that female students in both experimental and control group achieve averagely higher than the male students. The findings of the hypothesis agreed with the study of Ref. [19], [20] which revealed that there was no significant difference between the academic achievement mean scores of male and female technical college students taught Basic Electricity using constructive

teaching method and those taught using meta-learning teaching method. The finding is in disagreement with the findings of Ref. [21] which indicated that there was significant difference in the achievement of male and female students. The disagreement with the present study could be as a result of the fact that previous study focused on using AUTOCAD in the teaching of technical drawing whereas the present study focused on using jigsaw teaching approach in teaching business education practicum.

The result obtained on the interaction effect of teaching approaches and gender on the academic achievement mean scores of business education students' in business education practicum using jigsaw teaching approach is higher than the mean gain of those taught business education practicum using lecture method. This implies that teaching approaches and gender interact to affect students' achievement in business education practicum. However, the interaction effect was not significant based on the data collected with an F ratio of 168.438 and p value of .000 with an e3ffect size of 0.725 which are greater than 0.05 level of significance, the alternative hypotheses of significant interaction effect of teaching method and gender on students' academic achievement mean scores in business education practicum was not rejected. Although the statistical analysis of this study showed that teaching approaches and gender did not have significant interaction effects on business education students' academic achievement in business education practicum. The observed differences could be due to chance. This findings is in line with the study by Ref. [20] which reported that gender and teaching methods had no significant interaction effect on students' academic achievement.

Conclusion

The study determined the effect of jigsaw teaching approach on students' academic achievement in business education practicum in colleges of education, South-East, Nigeria. Based on the findings of the study, it was observed that students taught with jigsaw teaching approach perform better than those taught with lecture method. Also gender did not influence the achievement of the students. This is to say that jigsaw teaching approach was not sensitive to gender in improving students' academic achievement in business education practicum. It was concluded that jigsaw teaching approach is more effective for improving and enhancing academic achievement of NCE II business education students in business education practicum irrespective of gender.

Limitation and Suggestions

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

- Business education lecturers in colleges of education should adopt jigsaw teaching approach which is cooperative and activity-based learning approach in order to improve students learning and achievement.
- Business education practicum lecturers should provide equal opportunities and attention to both male and female students since gender does not have effect on the students achievement when exposed to jigsaw class.
- Business education practicum lecturers should monitor the students carefully during jigsaw classes to ensure there is adequate collaboration, active participation of each student and team work among group members so that the aim of adopting jigsaw teaching approach is not defeated.

Conflict of Interest

The authors declare that there is no conflict of interest.

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