COMPARATIVE EFFECT OF GUIDED-DISCOVERY METHOD ON CACHIEVEMENT IN FINANCIAL ACCOUNTING AMONG SECONDARY SCHOOL STUDENTS IN ANAMBRA STATE

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Abstract

This research investigated the effect of the conventional method of teaching and the guided-discovery method of teaching on students' achievement in financial accounting in senior secondary schools in Anambra State. Three research questions and three hypotheses guided the study. The quasi-experimental research design was utilized for the study. The population comprised all the ninety SS 2 financial accounting students in Awka and Aguata Education zones of Anambra state. The Financial Accounting Achievement Test (FAAT) was used for data collection. Mean, standard deviation and analysis of co-variance (ANCOVA) were used for data analysis. Findings indicated that students taught with guided-discovery method scored higher than those taught with conventional teaching method. The study also revealed no significant difference in the mean performance scores of male and female students taught with guided-discovery and conventional methods of teaching respectively. The study concluded that teacher's predominant usage of conventional method of instruction in teaching Financial Accounting is a contributory cause of students' failure in the subject and the use of guided-discovery method in place of conventional method will improve students' achievement in the subject. Consequently, it was recommended among others that government at all levels should improve the education sector through training of teachers in the use of effective instructional methods in the classroom, especially in the use of guided-discovery method in Financial Accounting instruction and possibly other school subjects.

Introduction

Accounting as one of the subjects in business education, has functions of developing in individuals, skills, knowledge, attitudes and values towards solving problems and satisfaction of real needs in life. Accounting is a very important branch of business education in which much of our daily life is governed and attached, by the results and application of business.

Federal Republic of Nigeria (2004) stated that the broad goal of the secondary school education is to prepare individuals for useful living in the society and for higher education. To achieve this objective, secondary school education in Nigeria has six years duration given in two stages- three years of junior secondary school followed by three years of senior

secondary school. The curriculum designed for senior secondary school is comprehensive, broad based and aimed at broadening student's knowledge and outlook. Subjects offered in senior secondary schools are in three groups core subjects, vocational and non-vocational subjects. One of the subjects offered at senior secondary school level is Financial Accounting.

According to Asaolu (2002), financial accounting is the process of recording, classifying, selecting, measuring, interpreting, summarizing and reporting financial data of an organization to the users for objective assessment and decision-making. Accounting data are processed into accounting information through the use of accounting principles. They are the basic fundamentals which guide accountants in recording, appreciating and assessing accounting information as well as the preparation and interpretation of financial statements. The accounting information system is proven, time honoured, and its format is universally understood. Books of accounts prepared by accountants in one part of the world are easily understood by their counterparts in other parts of the world because the information systems are based on principles that are widely accepted and globally used. According to the National Examination Council (2004), the objectives of studying financial accounting at the senior secondary school level are as follows:

1. To enable senior secondary school students appreciate the basic rules, functions and principles of accounting.
2. To lay a proper foundation for further study of accountancy and allied courses at tertiary level; and
3. To enable the students understand basic accounting principles and practice, as well as their applications in modern business activities.

To achieve the above stated objectives, financial accounting teachers employ various instructional methods in the classroom. According to Cantrell (2004), teaching methods are in a continuum ranging from teacher-centered to student-centered methods.

The teacher-centered method of teaching is conventional and widely used in the classroom. Cantrell also highlighted the characteristics of teacher-centered method to include leader-centered, leader-active, learner- passive and content-emphasis. Examples of teacher-centered methods are lecture, discussion, traditional demonstration, guest speaker, panel discussion, storytelling, dramatization and reading of textbooks, manuals or handouts. The student-centered method is an approach where the learner generates his or her own form of information. It is characterized by the following features: learner-centered, leader-facilitated, learner active and learning process-emphasis.

Statement of the Problem

The information available from school records like WAEC (2004) and the report of Ogunu (2000) clearly showed that vast majority of students perform poorly in accounting annually

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especially financial accounting. Academic achievement in education is believed to be a product of teachers' teaching method. It has been established and re-affirmed by investigation that creative teaching strategy that is learner-oriented and problem-solving based as used in science and recommended by chief examiners of WAEC (2010) should be used as a solution to this problem. The use of guided-discovery approach in teaching would be effective in the teaching of financial accounting and hence improve students' achievement. Guided-discovery was developed by Dr. Charles E. Wales at the Centre for Guided Design, West Virginia University (Leutner, 1993). Discovery learning is much older and other forms of structuredness do exist.

Guided discovery is characterized by convergent thinking. The instructor devises a series of statements or questions that guide the learner, step by logical steps, making a series of discoveries that lead to a single predetermined goal. In other words that instructor initiates a stimulus and the learner reacts by engaging in active inquiry thereby discovering the appropriate response. Guided-discovery approach would affect the mean achievement of male and female students in financial accounting to a very reasonable high extent.

Research Questions

The following research questions guided the study.

1. What is the difference in the pre-test mean achievement scores and post-test mean achievement scores of the experimental and control groups in financial accounting?
2. To what extent do the mean achievement scores of male students taught financial accounting with conventional method compare with the performance scores of their female counterparts?
3. To what extent do the mean achievement scores of male and female students taught financial accounting with guided-discovery teaching method differ?

Hypotheses

The following null hypotheses and were tested at 0.05 level of significance.

1. There is no significant difference in pre-test mean achievement scores and post-test mean achievement scores in financial accounting among the experimental and control groups.
2. There is no significant difference in the mean achievement scores of male and female students taught financial accounting with conventional teaching method.
3. There is no significant difference in the mean achievement scores of male and female students taught financial accounting with guided-discovery teaching method.

Method

The research was carried out using quasi-experimental design of pre-test, post-test control group. The design offered less rigorous experimental control as compared to the true experimental design. The design was specific with non-randomized control group and non-equivalent groups. This was because the subjects were taken as intact groups composed of mixed of low and high achievers. In addition, the design was expected to correct various group differences statistically.

The population of the study comprised all the sixty-three Senior Secondary Schools two (SS2) financial accounting students with the population of 820 students in all the six education zones of Anambra State in Nigeria.

The sample size for this study consists of sixty-three financial accounting students. Purposive sampling technique was adopted and used to select schools for the study. Survey of co-educational public secondary day schools was carried out to identify schools that have at least a stream of financial accounting in Senior Secondary School class two (popularly called the SS2). Only schools that have at least one graduate financial accounting teacher with relevant professional teaching qualifications teaching the group used for the study was chosen. Chosen schools were randomly assigned to experimental and control group while students in the sample schools remained in their in-tact classes.

Instrument for Data Collection

Two types of instrument that were employed for data collection in this study included

(a) Instructional Package for Financial Accounting (IPFA)
(b) Financial Accounting Achievement Test (FAAT)

The instructional package consists of prepared lesson plans on selected topics based on guided-discovery method of instruction on the one hand and conventional method of instruction on the other. The accounting text book recommended for use by the examining bodies for senior secondary school examination (WAEC and NECO) was used and the topics were taught in line with the Anambra state senior secondary school scheme of work in financial accounting. No special teaching session was organized. Teaching was done in accordance with the selected schools' time-table allocation in financial accounting.

The lesson plans were prepared on topic by topic and matched to period by period basis. Lesson plans outlined the period, the topic and the behavioural objectives of each lesson.

FAAT consists of 20 multiple test items covering the following concepts on partnership accounts. Item analysis was conducted on FAAT to ensure standardization of the items. The behaviour measured included knowledge of terms, principles and concepts, interpretation of practice question, application of principles and concepts to practice

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questions. The areas of coverage were as prescribed by NECO and WAEC 2004 financial accounting syllabus for senior secondary school.

IPFA was validated by specialists. Lecturers in vocational education (Business Education), educational psychology and curriculum studies in the Faculty of Education, Nnamdi Azikiwe University, Awka were consulted. Their criticisms, suggestions and recommendations in terms of relevance to the subject matter, coverage of the content areas, appropriateness of the language and clarity of purpose were incorporated in the final version of the instructional package.

The reliability of the test instrument was determined by administering the test instrument to SS II students within the age range of 14 -16years in another school within the same study area. The school chosen met all the requirements which qualified the original four chosen schools for the study. Kuder Richardson 21 (KR-21) formula was used to establish the reliability of the instrument. The researcher administered a 20 item test on an intact class of 26 students. The mean is 17 while the standard deviation is 5, using the KR21 formula the reliability coefficient of 0.91 was obtained which is a very high coefficient and shows that the instrument is reliable for the study.

The data collection phase lasted for five weeks comprising one single period of forty minutes and double periods of eighty minutes per week. The single period was used solely for worked examples and they proceeded the double periods which were used for instructional activities on the selected topics. All the students in both groups were pre-tested with financial accounting achievement test a week before and after treatment began. The pre-test scores served as a basis for comparing student's performance in financial accounting test before and after treatment.

The experimental group was taught with guided-discovery method of instruction while the control group was taught with chosen accounting concepts with conventional method using only the chalkboard and the recommended accounting textbooks. There was no time for students' interaction in groups. The teacher did most of the talking without any other teaching aids besides chalk, chalkboard and the recommended textbooks.

The treatment group was taught with guided discovery method, graphical representations/organizers were employed to guide students' cognitive process and mental road maps on important points. Relevant questions were carefully matched with the relevant concepts. The concepts were organized logically in order to facilitate easy information processing and as stimuli to elicit students' response to relevant questions. Practical works on accounting practice were given to the students after each classroom interaction session.

Some extraneous variables anticipated to affect this study included: teacher factors, student factors, and school principals' factors (cooperation). To control possible effects of the above extraneous variables, the researcher organized a one day seminar for the financial accounting teachers of the affected schools. The date for the seminar was chosen by

consensus. The researcher offered some reward to the teachers for task engagement. Before instructions, students in the experimental group were given questions on relevant concepts bordering on meaningful understanding of concepts. They were taught collaborative and cooperative learning strategies before they were assigned to groups.

Mean and standard deviation were used to analyze relative to the research questions. The mean score of 2.5 and above is regarded as accepted. Analysis of co-variance (ANCOVA) was used in testing the hypotheses. If the calculated value is greater than the critical value, the null hypotheses is rejected and the alternative retained. On the other hand, when the calculated value is less than or equal to the critical value, the null hypotheses is retained.

Results

The results of the analysis are presented below:

Research Question 1

What is the difference in the pre-test mean achievement scores and post-test mean achievement scores of students taught with conventional method and those taught with guided- discovery teaching method in financial accounting?

Table 1: ANCOVA analysis of the pre-test mean achievement scores and post-test mean achievement scores of students taught with conventional teaching method and those taught with guided- discovery teaching method.

Group *n=63*	Test	N	Min	Max	Mean	SD
Control	Pre- test	30	18	61	39.10	8.876
n=30	Post-test	30	23	70	46.60	9.050
Experimental	Pre- test	33	25	62	47.21	7.853
n=33	Post test	33	58	94	77.94	9.041

Note. *Min* = minimum; *Max* = maximum; *SD* = standard deviation.

As shown in Table 1, the pre-test mean achievement of the conventional teaching method ranges from 18 to 61 with SD= ± 8.876 while post- test mean achievement of the conventional teaching method ranges from 23 to 70 with SD= ±9.050. Also Table 1 reveals the pre-test mean achievement of the guided- discovery teaching method ranging from 25 to 62 with SD= ± 7.853 with post- test mean achievement of the guided-discovery teaching method ranges from 58 to 94 with SD= ±9.041.

Hypothesis 1

There is no significant difference in pre-test mean achievement scores and post-test mean achievement scores in financial accounting among the experimental and control groups. ANCOVA was used to test for the differences and results from the ANCOVA are summarized in the table below:

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Table 2: ANCOVA result for the pre-test and post-test mean achievement scores in financial accounting among the experimental and control groups.

Source	Sum of square	df	Mean square	F	Sig value
Corrected model	14.764	2	7.382	466.039	.000
Intercept	14.185	1	14.185	895.517	.000
Pre-test	2.890	1	2.890	182.426	.000
Post-test	11.693	1	11.693	738.229	.000
Error	.950	60	.016		
Total	153.000	63			
Corrected Total	15.714	62			

R squared=.940 (adjusted R squared=.938).

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measurement of the covariate. The result showed that there was a significant interaction effect. F (18, 94) = 895.517, p < .0005, with a large effect size (R squared = .940). Neither of the main effects were statistically significant, Scores, Pre-test: F (18, 62) = 182.426, p = .000; Post test: F (23, 94) = 738.229, p = .000. These results suggest that students taught with conventional and guided- discovery method of teaching respond differently to the two types of interventions (pre-test and post-test). Therefore the researcher concluded that there is a significant difference in pre-test mean achievement scores and post-test mean achievement scores in financial accounting among the experimental and control groups thereby rejecting the null hypothesis.

Research Question 2

To what extent do the mean achievement scores of male students taught financial accounting with conventional teaching method compare with the achievement scores of their female counterparts?

Table 3: The mean achievement scores of male and female students taught with conventional teaching method.

Group *n=30*	Sex	N	Min	Max	Mean	SD
Control	Male	8	33.5	46.5	40.37	5.501
	Female	22	20.5	65.5	43.75	9.830

Note. *Min* = minimum; *Max* = maximum; *SD* = standard deviation

Table 3 shows the mean achievement scores of male and female students taught with conventional teaching method. It shows that the mean achievement scores of male students

taught with conventional method ranged from 33.5 to 46.5 with SD= ±5.501 and for the mean achievement of scores for female students taught with conventional methods ranges from 20.5 to 65.5 with SD= ± 9.830.

Hypothesis 2

There is no significant difference in the mean achievement scores of male and female students taught financial accounting with conventional teaching method.

Table 4: ANCOVA result revealing the level of significant difference in the mean achievement scores of male and female students taught financial accounting with conventional teaching method.

Source	Sum of square	df	Mean square	F	Sig value
Corrected model .	170	1	.170	.835	.369
Intercept	2.250	1	2.250	11.061	.002
Mean value	.170	1	.170	.835	.369
Error	5.697	28	.203		
Total	96.000	30			
Corrected Total	5.867	29			

R squared=.029 (adjusted R squared=.006).

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measurement of the covariate. The result showed that there was significant interaction effect. F (20, 65) = 11.061, p < .0005, with a less effect size (R squared = .029). The main effects was not statistically significant, mean scores, mean value: F (20, 65) = .835, p = .369.

Critical region: If sig-value = 0.05 we reject H_0, otherwise accept H_0.

Decision: Since the Sig-value is 0.369 which is less than 0.05, the researcher conclude by accepting the null hypothesis which states that there is no significant difference in the mean achievement scores of male and female students taught financial accounting with conventional teaching method.

Researcher Question 3

To what extent do the mean achievement scores of male and female students taught with guided discovery teaching method differ?

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Table 5: Mean achievement scores of male and female students taught with guided-discovery teaching method.

Group*n=33*	Sex	N	Min	Max	Mean	SD
Experimental	Male	11	41.5	71.0	61.91	8.197
Female	22	51.0	77.0	62.91	8.452	

Note. *Min* = minimum; *Max* = maximum; *SD* = standard deviation.

Table 5 reveals the mean achievement scores of male and female students taught with guided discovery teaching method. It shows that mean achievement scores of male students taught with guided discovery method ranges from 41.5 to 71.0 with SD= ±8.197 and for the mean achievement of scores for female students taught with guided discovery methods ranges from 51 to 77 with SD= ± 8.452.

Hypothesis 3: There is no significant difference in the mean achievement scores of male and female students taught financial accounting with guided discovery teaching method.

Table 6: ANCOVA showing the significant difference in the mean achievement scores of male and female students taught financial accounting with guided-discovery teaching method.

Source	Sum of square	Df	Mean square	F	Sig value
Corrected model .	025	1	.025	.105	.748
Intercept	1.161	1	1.161	4.923	.034
Mean value	.025	1	.025	.105	.748
Error	7.309	31	.236		
Total	99.000	33			
Corrected Total	7.333	32			

R squared=.003 (adjusted R squared=.029).

Hypothesis 3 shows the level of significant difference in the mean achievement scores of male and female students taught financial accounting with guided discovery teaching method. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measurement of the covariate. The result showed that there was significant interaction effect. F (41, 77) = .034, p 0.0005, with a less effect size (R squared = .003). The main effects was not statistically significant, Mean scores, mean value: F (41, 77) = .105, p = .748.

Critical region: If sig-value = 0.05 we reject H_0, otherwise accept H_0.

Decision: Since the Significant value is 0.369 which is 0.05, the researcher conclude by accepting the null hypothesis which states that there is no significant difference in the mean performance scores of male and female students taught financial accounting with guided discovery teaching method.

The results showed that there were statistically significant differences in pre- test mean achievement scores and post-test mean achievement scores in financial accounting among the experimental and control groups, there is a significant difference in mean achievement scores of financial accounting among the experimental and control groups and also there is no significant difference in the mean achievement scores of male and female students taught financial accounting with conventional teaching method and that there is no significant difference in the mean achievement scores of male and female students taught financial accounting with guided discovery teaching method.

Discussions/ Results

Tables 1, 2, 3 and 4 show the descriptive and inferential statistics on the study. The mean achievement scores are descriptive or representative scores of the group or variables they represent while the Ancova scores (calculated and critical values) provide premise for making inferences or deductions on their relevant tested hypotheses.

Table 1 showed a significant difference between the academic performance in the pre-test and post-test of students taught with guided discovery method (experimental group) and conventional method (control group). This is in accordance with Toby (1997) opinion that individual and group mean achievement score should serve as basis for making judgement on whether a group or individual has achieved a pre-determined stated objective or not. He is of the opinion that mean achievement scores should be regarded as a reliable performance indicator of the treatment given (instructional method). In other words the effectiveness of the instructional method employed in the classroom can be evaluated based on the obtained mean achievement score of the group.

Table 2 also showed that the different treatments given to the experimental and control groups effected positive changes on the students mean achievement scores in post-test financial accounting achievement test. However, about how much and to what degree is the conventional method of instruction or vice-versa in achievement of the objectives of students appreciation of basic rules, functions and principles of accounting, students' understanding of basic accounting principles, practice and their practical applications to modern business activities and laying proper foundation for further study of accountancy and allied courses at higher level was not shown.

Table 3 and 4 provided the required statistics to answer the second research question and test hypothesis which center around the effectiveness or otherwise of the guided-discovery method and the conventional method in achieving the stated objectives. Table 2

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showed a difference between the experimental group post-test mean score and control group post-test mean score. This shows that the students taught with the guided-discovery method has a high level of attainment level. The quality of mean achievement score in experimental group which is a credit pass is also better than the control group's ordinary pass. This implies that the differences in experimental and control group mean achievement is not a chance factor but an indication of effectiveness of guided-discovery method over conventional method of teaching and learning financial accounting concepts. In this respect, guided discovery method of instruction can be said to be a better method of laying solid foundation and enhancing students' understanding interpretation and application of financial accounting rules, concepts and principles to modern day business activities.

There is also the need to know to what extent, if any, the effect of variable such as students' gender difference on their groups' mean achievement scores. Tables 7 and 6 statistically were used to test the research question and hypothesis. Tables 6 shows that students' gender difference has no significant effect on the control groups' mean performance while tables 6 showed that experimental group mean achievement is purely an expression of treatment effectiveness on the effect guided-discovery method on student achievement and not a product of gender difference interplay on students' achievement.

Conclusion

The fact that the post-test mean achievement scores of students taught with conventional method did not differ from the recent financial accounting student's performance trend in public examination as reported by WAEC (2004). It shows that teachers' predominant usage of conventional method of instruction in financial accounting teaching is a contributory cause of student failure in the subject. The use of guided- discovery method in place of conventional method will improve student's achievement and change the ugly failure rate trend in financial accounting achievement test. Persistent use of conventional method of instruction in financial accounting will perpetuate the failure trend.

Recommendations

In line with the findings of this study, the researcher recommends:

1. Since no nation can be greater than the quality of her teachers; to improve the nation's standard of living and reduce crime rate, unemployment, industrial inefficiency, high capital flight to oversee countries through employment/engagement of expatriates, the educational sector should be improved through training of teachers in the use of effective instructional method in the classroom, especially in the use of guided discovery in financial accounting instruction.
2. Professional bodies such as Association of Business Educators of Nigeria (ABEN), and examination bodies such as National Business and Technical Education Board (NABTEB), West African Examination Council (WAEC) and National Examination Council (NECO) should organize seminars, workshops and in-house training for teachers and textbook authors in the use of Guided-Discovery Method in financial accounting and other effective methods of teaching of other courses.
3. Incentives such as scholarships, grants or loans should be made available to research students and institutions to carry-out more work or study on effective strategies in classroom instructions in general and particularly more study should be done on various techniques of using guided-discovery method in classroom teaching and learning.

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