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Effect of Personalized System of Instruction on Academic Achievement and Retention of Senior Secondary School Students in Financial Accounting in Bauchi State, Nigeria

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Abstract

The study determined the Effect of Personalized System of Instruction on Academic Achievement and Retention of Public Senior Secondary School Students in Financial Accounting in Bauchi State, Nigeria. The study adopted quasi-experimental research design. Nine research questions and hypothesis were used to guide the study. The population for the study comprised 2,602 SSII students from the 65 secondary schools offering financial accounting in the three educational zones of Bauchi State. A sample size of 127 financial accounting students were used in the research and Simple random sampling technique was used to select one school from the three educational zones in the state: GDSS Bakari Dukku 46 students, GDSS Soro 37 students and GDSS Azare 44 making The instrument for data collection was a 40-item multiple choice Financial Accounting Achievement Test (FAAT). The instrument was validated by three experts. The reliability of the instrument was determined using K-R-20 which yielded a reliability coefficient of 0.78. Before the commencement of the experiment, the regular financial accounting teachers in the three schools selected exposed both students in experimental and control group to pre-test in order to obtain the pre-test scores for the study. On completion of the experiment, the post-test was administered and after two weeks the post post-test was also administered. The data collected were analyzed using mean and standard deviation to analyze the research questions while ANCOVA and paired sample t-test statistic were used for testing the null hypotheses at 0.05 level of significance. The study found that personalized system of instruction improves students' academic achievement, interest and knowledge retention in financial accounting than conventional lecture method. There was also a significant difference in the mean achievement scores of students taught using personalized system of instruction and those taught with conventional lecture method. This study has implication to educational development by placing a responsibility to the curriculum planners and educational policy makers in charge of secondary schools education to consider a review of the financial accounting curriculum to incorporate innovative pedagogies such as personalized system of education into the curriculum to enhance students' academic achievement and retention in financial accounting. It was recommended, among others, that seminars, workshops and conferences should be organized by educational administrators and the ministry of education where senior secondary school teachers will be trained on the application of this personalized system of instruction for effective teaching and learning of financial accounting.

Keywords: *Personalize system of instruction, academic achievement, knowledge retention*

Introduction

Education is a vital tool used by every society to transform her citizens to become more useful, competent, and self-reliant and to inculcate into them required skills, competencies and abilities needed to become functional in the society. In Nigeria, the Federal Ministry of Education plays major role in regulating the

education system, such as the establishment of education policy and ensuring quality control. The education sector in Nigeria is divided into three (3) subsectors, namely: basic education (six years primary, three years junior secondary school) and three years senior secondary school education (SSI to SSIII), and tertiary education. However, the focus of this study is on senior secondary education. Secondary education in Nigeria comprises the junior secondary school (JSS) and senior secondary school (SSS). him for higher education.

The curriculum designed for senior secondary school education is comprehensive and broad-based, and it is aimed at broadening students' knowledge and outlook. The subjects offered at the senior secondary school level in Nigeria are in three categories: (1) core subjects (English language,mathematics, civic education); (2) non-vocational subjects (Government, religion, history, literature) and (3) vocational subjects which include but not limited to: (office practice, marketing, animal husbandry, entrepreneur and financial accounting) as stated in national policy of education (FRN,2014). Financial accounting involves the recording, classifying and summarizing of financial transactions in monetary terms for decision making. Adamu and Jibrin (2017) described financial accounting as the recording, classifying, summarizing and reporting financial information to the end users. The subject is geared toward providing students with professional skills and knowledge needed for financial management. The objectives of financial accounting at the secondary school level as stated in the National Policy on Education, (FRN, 2014) is to: train the students of secondary schools for careers in the field of business; assist the students to play their economic roles as workers, consumers and citizens; and prepare them for further education at the tertiary level.

However, the attainment of the stated objectives of financial accounting in secondary schools in Nigeria is threatened by the continuous decline in the academic achievement of secondary school students. Adamu and Sani (2016), academic achievement of secondary school students in financial accounting in Nigeria was reported to be low. Similarly, the report is not different from the report of Babaji (2020) who conducted a study in Bauchi State. The study revealed that the academic achievement of secondary school students in financial account was unsatisfactory as the WAEC analysis of results of financial accounting students in the state for 2020, 2021, 2022 and 2023 academic years showed an increase in the percentage failure rate of students in the subject as follows; (2020, 2021, 2022, 2023) (60%), (77%), (81%) and (88%) respectively. In an attempt to reverse the ugly situation of students' poor academic achievement in financial accounting, a number of studies have been conducted to identify and analyze the factors that affect academic achievement in various subjects. Igwe and Ikatule (2011) attributed poor academic achievement of students to deficiency in teaching method(s) used by teachers. Most of the authors agree that the predominant used of conventional lecture method in teaching students' practical subjects like

financial accounting contribute to the poor academic achievement.

Conventional lecture method is teacher- centered and is characterized by verbal presentation of ideas, concepts and generalization of facts by the teacher to the students who are passive listeners (Coffey, 2012). The teacher does much of the activities while students are slightly involved in note taking or passively listening to the teacher. Nwaukwa and Okolocha (2020), asserted that financial accounting is a subject that cannot be mastered by rote learning and memorization of basic concepts and principles but has a need of sound theoretical knowledge and intensive practice in its application due to its procedural and organized nature. Conventional (lecture) method of teaching has its own usefulness but may not be an effective instructional method for improving students' achievement in skill-based subjects like accounting. In the light of these developments, it becomes expedient to research on suitable instructional method like personalized system of instruction to foster students' academic achievement in financial accounting particularly in Bauchi State.

Personalized system of instruction can be described as one-on-one teaching strategies. According to Tomlinson (2014), personalized system of instruction is a teaching method where the teacher takes into consideration the diverse nature of the students and provides support for students who learn in different ways and at different rates, and who bring to school different talents and interests. Personalized system of instruction is defined as a method of instruction that takes in to account individual students' characteristics, needs, and flexible instructional practices in organizing the learning environment (Romiro, 2015). The personalized system of instruction (PSI) otherwise called Kellers Plan is a mastery-oriented system of individualized instruction which seeks to promote mastery of a pre-specified set of objectives for each learner. Its major features are self-spacing on the part of the learners, unit mastery, emphasis on written word, frequent testing, immediate feedback. (Paura, 2012). Personalized system of instruction in the context of this work refers to the type of instructional method that takes in to consideration the strength, weakness and personal characteristic of individual students in the teaching and learning process.

In PSI, the teacher plays a role of motivator rather than source of critical information for learners. One feature that distinguishes PSI from other systems of individualized instruction is the use of proctors which facilitate frequent testing, immediate feedback and one-to-one prompt attention to the individual student. The use of proctor enhances social interaction in the educational system (Hurst, Wallace & Nixon, (2013). Fox (2004) defined proctor as a person who assists the instructor in administering test, gives immediate reinforcement for students' performance and provides valuable information to the instructor or course convener. The proctor is responsible for

providing students with immediate feedback concerning the appropriateness of answers and for prescribing further study in the area with the aim of enhancing students' academic achievement and knowledge retention.

Retention occurs when facts or experiences are stored in the long-term memory. Knowledge retention is an essential component of student learning. Teachers rightfully focus their attention on helping students acquire new knowledge and skills, but newly acquired information is vulnerable and easily slips away. Retention is the preservative factor of the mind (Kundu and Totoo, 2009). Duffy (2013) argued that students' retention of learning in financial accounting is determined by factors such as teachers' ability, motivation, interest and meaningfulness of the subject matter, method of instruction and memory capacity of the learners among others. Numerous factors may affect retention among which are emotion, painful experience and intentionally forgotten or repressed (Bichi, 2012). Furthermore, Enwere (2012), viewed retention in financial accounting with great importance because concepts are hierarchical in nature, meaning that students build on already known financial accounting concepts to establish an unknown concept. According to Ewere, financial accounting concepts need to be presented to the learners in a way that make recalling of concept fast and easy. The level of retention in financial accounting may be determined by the type of material and method used in teaching the subject (Ishaq in Enwere, 2020). Dania, (2014) argued that in teaching and learning the concept of financial accounting, different techniques can be applied to make learning meaningful and also give the students the opportunity to retain what they have learnt in a classroom irrespective of their gender.

Statement of the problem

One of the major difficulties facing the educational sector in Nigeria is the low level of academic achievement of students in internal and standardized examinations. This has become a great concern for researchers, educators and stake-holders in the educational sector over the years. This is evident in several results of WAEC as shown by the Chief Examiners Report in the West African Senior Certificate Examination in 2019 showed that the academic achievement of students in financial accounting in Nigeria was very poor. The situation is not different in Bauchi State as the WAEC analysis of results of financial accounting students in the state for 2019, 2021, 2022 and 2023 academic years showed an increase in the percentage failure rate of students from 60%, 77%, 81. % and 88% respectively.

This ugly situation of poor students' academic achievement makes it difficult to produce competent secondary school graduates with pre-requisite knowledge and requirement to further their education in accounting at the tertiary education level. Although, several attempts have been made by government, researchers and non-governmental organizations to identify the major causes of poor academic achievement in financial accounting among senior secondary

school students in Bauchi State but the situation remain the same. Literatures and observation by the researcher also revealed that in teaching financial accounting in public senior secondary school in Bauchi State, different teaching methods such as lecture, demonstration, discussion, have been used but could not improve the academic achievement of students in financial accounting.

The teaching methods that seem not to be commonly used in teaching financial accounting in Bauchi state are innovative teaching methods such as peer tutoring, guided discovery, and personalized system of instruction. It is against this backdrop that the researcher to fill the gap by investigating the effect of personalized system of instruction on academic achievement, interest and retention of public senior secondary school students in financial accounting in Bauchi State, Nigeria.

Purpose of the Study

This study determined the Effect of Personalized System of Instruction on Academic Achievement, Interest and Retention of Secondary School Students in Financial Accounting in Bauchi State. Specifically, the study determined the:

1. Effect of personalized system of instruction and conventional lecture method on students' achievement in financial accounting.
2. Effect of personalized system of instruction and conventional lecture method on students' retention in financial accounting.

Research Question

The following research questions guided this study;

1. What are the mean academic achievement scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method?
2. What are the mean interest scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

Ho_1: There is no significant difference in the mean achievement scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method.

Ho_2: There is no significant difference in the mean interest scores of students taught financial accounting using personalized system of instruction and those taught using the conventional lecture method.

Methodology

The study adopted quasi-experimental research design. Quasi-experimental design. In this study, intact class in both experimental and control group was used. Quasi-experimental design is suitable for

this study because it is not possible for the researcher to randomly select respondents and assign them to experimental and control groups without disrupting the time table and academic programme of the schools involved in this study. The study was conducted in the three senior secondary schools selected from the three educational Zones in Bauchi State.

The population of this study comprised 2,062 (2022/2023) SSII students offering financial accounting in public senior secondary in Bauchi state, Nigeria. The SSII was used in this study due to the fact that the SSII students have offered financial accounting from SSI. Another justification for choosing the SSII students is because they are not under the pressure of preparing for external examination. The sample size of the study comprised 127 SSII students offering financial accounting in the intact classes of three schools select from Bauchi, Darazo and Katagum educational zones in Bauchi State. Purposive sampling technique was used in selecting the schools

The instrument used for data collection was financial Accounting Achievement Test (FAAT)" it contains 40 multiple questions with option A-D, aimed at testing students' achievement in Financial Accounting. The FAAT questions ware developed by the researcher based on the SSII harmonized scheme issued by Bauchi State Ministry of Education. The same instrument used to measure students' achievement was reshuffled and administered after two weeks to measure knowledge retention level of the students.The face and content validation of the instrument was done by three experts. Two of them from Department of Business Education and one from Measurement and Evaluation Unit, Department of Science Education, all in University of Nigeria, Nsukka. The experts were requested to validate the instrument based on their appropriateness, clarity and suitability of the instrument. Major corrections and inputs pointed out by the experts were used to improve the quality of the instrument. After the validation, the researcher effected the corrections in the final copy of the instrument. In order to ascertain the reliability of the research instrument, pilot testing was conducted in Government Comprehensive Day Secondary School (GCDSS) Gombe, Gombe State is outside the study area. The copies of the scripts used in the pilot testing were scored by the researcher. The internal consistency of FAAT was calculated using Kuder Richardspm (K-R-20) while. The statistical analysis yielded coefficient values of 0.71.

Three research assistants, who were the financial accounting teachers in the selected schools, were used to administer pre-test (multiple choice tests of 40 items question), before the treatment under the supervision of the researcher, who visited all the selected schools in the first week to make sure that the pre-test was administered in his presence. Then the results were retrieved immediately and the scores recorded. The treatment was applied to the students for four weeks. After the treatment, the researcher reshuffled the questions and

gave the research assistant to re-administer the test as post-test. The same FAAT was reshuffled and used for post-post test. The scripts were marked and the scores recorded. Mean and standard deviation was used to analyze the research questions. While the hypotheses were tested using analysis of Covariance (ANCOVA) at 0.05 Level of significance. Any hypotheses with P-Value greater than or equal to 0.05 were accepted while hypotheses with P-value less than 0.05 were rejected. Statistical Package for Social Science (SPSS, version 23) was used for the analysis.

Results

Data for the study were presented and analyzed based on the research questions and hypotheses that guided the study. The details are contained in the tables 1-4.

Research Question One

What are the mean academic achievement scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method?

Table 1: Mean and Standard Deviation of Academic Achievement Scores of Students Taught Financial Accounting using Personalized System of Instruction and Those Taught using Conventional Lecture Method

Groups	Methods	N	(Pre-Test)		(Post-Test)		AM
			$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	
Experimental	Personalized System Instruction	62	46.91	2.48	74.96	3.74	28.05
Control Group	Conventional Lecture Method	65	44.69	4.30	51.46	4.95	6.77

Key: $\overline{X}$=Mean, SD = Standard Deviation, AM = Adjusted Mean

Table 1 presents the mean academic achievement scores of students taught financial accounting using personalized system of instruction (PSI) and those taught using the conventional lecture method (CLM). The results show that the students who are exposed to personalized system of instruction have pre-test mean academic achievement score of 46.91 with a standard deviation of 2.48, while those who are taught using the conventional lecture method have pre-test mean academic achievement score of 44.69 with a corresponding standard deviation of 4.30, indicating that at pre-test, both the experimental and control groups have similar baseline mean academic achievement scores.

However, at post-test, the mean academic scores of students taught using the personalized system of instruction is 74.96 with a standard deviation of 3.74 reflecting adjusted mean of 28.05. On the other hand, those taught using conventional lecture method obtained mean academic achievement score of 51.46 with a standard deviation of 4.95 and adjusted mean of 6.77. Since the

adjusted mean score of the treatment group is greater than that of the control group, it implies that personalized system of instruction is more effective than the conventional lecture method in teaching and learning financial accounting in secondary schools.

Hypothesis One: There is no significant difference in the mean achievement scores of Students taught financial accounting using personalized system of instruction and those taught using conventional lecture method.

Table 2: Summary of Analysis of Covariance (ANCOVA) on the Mean Academic Achievement Scores of Students Taught Financial Accounting using Personalized System of Instruction and those Taught with Conventional Lecture Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Dec.
Corrected Model	17689.288a	4	4422.322	239.884	.000	.887	
Intercept	2522.994	1	2522.994	136.857	.000	.529	
PRETEST	8.635	1	8.635	.468	.495	.004	
RESPONDENTS	17543.493	1	17543.493	951.627	.000	.886	S
GENDER	52.183	1	52.183	2.831	.095	.023	NS
RESPONDENTS * GENDER	114.258	1	114.258	6.198	.014	.048	NS
Error	2249.102	122	18.435				
Total	522902.010	127					
Corrected Total	19938.390	126					

a. R Squared = .887 (Adjusted R Squared = .883)

Key: F = F-ratio, Dec = Decision

Table 2 presents the summary of ANCOVA for the test of first hypothesis. Result shows an F-ratio of 951.627 with a probability value of .000 with an effect size of .886. Since the associated probability value of 0.00 is less than the 0.05 significant levels at 1 degree of freedom, hypothesis one is rejected. Therefore, it is inferred that there is a significant difference between the mean academic achievement scores of students taught financial accounting using personalized system of instruction and those taught using the conventional lecture method. This, indicates that the personalized system of instruction is more effective in improving the students'

academic achievement in financial accounting than the conventional lecture method. The result further shows that a partial eta square, η_p^2 (effect size) of 0.886 is obtained. This is an indication that 88.6% of the variance increase in the mean academic achievement scores of students taught financial accounting is due to the effect of teaching method

Research Question Two; what are the mean retention scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method.

Table 5: Mean and Standard Deviation of Knowledge Retention Scores of Students Taught Financial Accounting using Personalized System of Instruction and Those Taught using Conventional Lecture Method

Groups	Methods	N	(Post-Test)		(Post-Post-Test)		AM
			$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	
Experimental	Personalized System Instruction	62	74.96	3.74	79.44	6.05	4.48
Control Group	Conventional Lecture Method	65	51.46	4.95	52.54	4.99	1.08

Key:$\overline{X}$=Mean, SD = Standard Deviation, AM = Adjusted Mean

Table 5 presents the mean and standard deviation of knowledge retention scores of students taught financial accounting using personalized system of instruction and those taught using conventional lecture method**.** The result shows that the experimental group has a mean score of 74.96 with a standard deviation of 3.74 in the post test, and a post-post test means score of 79.44 with a standard deviation of 6.05 and adjusted mean of 4.48. On the other hand, the control group has a post- test mean score of 51.46 with a standard deviation of 4.95, and a post-post test mean score of 52.54 with a standard deviation of 4.99 and a mean gain of 1.08.

The result indicates that the experimental group has higher adjusted mean score than the control group. This implies that students taught financial accounting using personalized system of instruction are able to retain more knowledge of financial accounting compared to their counterparts in control group that are taught using conventional lecture method.

Hypothesis Two: There is no significant difference in mean retention score of students taught financial accounting using the personalized system of instruction and those taught using conventional lecture method.

Table 6: Summary of Analysis of Covariance (ANCOVA) on the Mean Knowledge Retention Scores of Students Taught Financial Accounting using Personalized System Instruction and Those Taught using Conventional Lecture Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Dec.
Corrected Model	25137.886a	4	6284.472	269.788	.000	.898	
Intercept	395.122	1	395.122	16.962	.000	.122	
POSTTEST	850.165	1	850.165	36.497	.000	.230	
RESPONDENTS	557.367	1	557.367	23.927	.000	.164	S
GENDER	159.225	1	159.225	6.835	.010	.053	NS
RESPONDENTS * GENDER	209.639	1	209.639	9.000	.003	.069	NS
Error	2841.882	122	23.294				
Total	569754.303	127					
Corrected Total	27979.768	126					

a. R Squared = .898 (Adjusted R Squared = .895)

Key: F = F-ratio, Dec = Decision.

Table 6 presents the summary of ANCOVA for the test of the third hypothesis. Result shows an F-ratio of 23.927 with a probability value of 0.00 with an effect size of 164. Since the associated probability value of 0.00 is less than the 0.05 significant levels at 1 degree of freedom, the third hypothesis is rejected. Therefore, it is inferred that there is significant difference between the mean retention scores of students taught financial accounting using personalized system of instruction and those taught using the conventional lecture method in favour of the treatment group. This, indicates that personalized system of instruction is more effective in enhancing the students' knowledge retention in financial accounting than the conventional lecture method. Furthermore, the partial eta-squared (η^2_p) of 0.164 is an indication that 16.4% of the increase in the mean retention score of students taught financial accounting is as a result of the treatment effect.

Discussion of the Findings

The finding on research question one revealed that personalized system of instruction was more effective in improving the students' academic achievement in financial accounting than the conventional lecture method. The null hypothesis of no significant difference between the mean academic achievement of students exposed to the personalized instruction and these in conventional lecture method of teaching was rejected because the associated probability value was less than the significant level. This finding is in agreement with the findings of Alalwneh and Alomari (2018) whose findings

showed that there was significant differences in the achievement between the students taught vocational subjects in experimental group (personalized system of instruction) and control group (conventional lecture method), and in favor of experimental group. This finding is in line with earlier study conducted by Aliyu, (2020) whose findings revealed that personalized instruction positively improved students' academic achievement in economics and there was a significant difference between the mean achievement scores of students taught economics using PSI and those taught using CLM.

The findings on research question three also found that financial accounting students taught using personalized system of instruction were able to retain more knowledge of financial accounting compared to their counterparts in control group that were taught using conventional lecture method. The findings further revealed that a significant difference existed between the mean retention scores of students taught financial accounting using personalized system of instruction and those taught using the conventional lecture method. These findings give credence to the previous findings of Olawumi, (2019) which revealed that students taught mathematics using PSI were able to retain the knowledge learnt more when compared to students in the control group.

Conclusion

This study investigated the effect of personalized system of instruction on academic achievement and retention of secondary school students in financial accounting in Bauchi State, Nigeria. Based on the findings of the study, it is inferred that the personalized system (PSI) of instruction was more effective than the conventional lecture method (CLM) in improving students' academic achievement and retention in financial accounting in Bauchi State. The positive results obtained could be attributed to the flexible nature of the innovative pedagogies (PSI) adopted in the study. It has been established in this study that innovative pedagogies such as PSI had positive effects on the students' academic achievement and retention in financial accounting.

Recommendations

Based on the findings and implications of this study, the following recommendations are made:

1. Financial accounting teachers should make deliberate efforts by attending in-service trainings to develop themselves on how to transit from traditional method of teaching like lecture method to innovative instructional strategies which will make them facilitators of learning and not information dispensers
2. Teachers of financial accounting in secondary schools should be encouraged by stakeholders to adopt personalized system of instruction to boost interest, academic achievement and knowledge retention of secondary school students in financial

accounting by organizing workshops and seminars.

3. Policy makers and curriculum planners should incorporate personalized system of instruction as method of teaching financial accounting in the curriculum of senior secondary schools.

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