



GUIDED INQUIRY VERSUS LECTURE INSTRUCTIONAL APPROACH: THEIR EFFECTS ON NIGERIAN SECONDARY SCHOOL STUDENTS' ACADEMIC PERFORMANCE

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Abstract:

This quasi-experimental study sought to determine whether secondary school students taught history using the guided inquiry approach would perform better in a post-test than those taught by the expository/lecture approach. It also aimed at finding out the comparative performances of male and female students taught using the guided inquiry instructional approach. Two research questions and two hypotheses were formulated to guide the study. The subjects consisted of 45 senior secondary school students of a secondary school in Imo State, Nigeria. These were randomly assigned to two treatment groups as follows: 20 to the guided inquiry and 25 to the lecture/expository group. The pre-test-post-test control group design was adopted. The experimental (E) group was taught using the guided inquiry method approach while the control (C) group was taught with the lecture/expository method. Efforts were made to control for the extraneous variables. The instrument for data collection was a 50 item History Achievement Test (HAT) which was developed and validated by the researchers. The reliability of the HAT was determined by using the Pearson's Product Moment Correlation Coefficient Statistic and it yielded an index of 0.78. The study lasted for 4 weeks during which the E at C groups were taught 3 topics of African History using the two methods. After the experimental treatment HAT was administered to the two groups. Data related to the research questions were analyzed using means and standard deviations while those related to the hypotheses were analyzed using analysis of covariance. The result showed that the group taught by the guided inquiry approach performed significantly better than the control group taught using the

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lecture/exposition approach. The performances of the students were not influenced by sex as a factor.

Keywords: guided inquiry method, lecture method, academic achievement

1. Introduction

Guided inquiry is explained as an instructional procedure whereby the lesson is set in order to solve simulated or real world problems (Azubike, 2015). She distinguishes among three variants of inquiry namely:

- structured inquiry - where students are given a problem to solve, a procedure for going about the solution including materials and resources to use, but not the expected outcome;
- open inquiry - where learners formulate the problem and find the procedure and materials for solving it; and
- guided inquiry - where students figure out the solution of the problem under the guidance of the teacher.

Crawford (2000) describes an inquiry as an empirically verifiable, productive way to cultivate understanding of concepts and phenomena; which also allows students to conduct research and understand scientific terms. In the guided inquiry approach to instruction, the teacher makes learners conduct investigations and construct their own meaning of the events or phenomena that occur naturally. It emphasizes higher order thinking skills and knowledge transfer across disciplines. It involves collecting, analyzing and synthesizing information and data from a variety of sources and viewpoints (Agboola and Oyemedede, 2007; Warner and Meyers, 2000). According to Bybee (2000) key elements in guided inquiry include; observation, hypotheses testing and feedback. Nwachukwu (2018) observes that history is, by itself, an inquiry, and so, using the guided inquiry methods to teach the subject will help the students to be more interested to inquire about the events of the past, relate to the present and plan for the future for national development.

Okafor (2005) investigated the effects of inquiry method of teaching on student achievement and interest in social studies in Anambra State, Nigeria. The findings proved the superiority of the inquiry approach over the predominantly expository procedure.

Orstein's (2007) study showed a more positive attitude to learning on the part of students taught physics using the inquiry method. The study by Agboola and Oyemedede (2007) investigated the effects of project, inquiry and lecture methods of instruction on senior secondary school students' achievement in chemistry. The results showed better performance by project method group than those taught using lecture while those taught using lecture performed better than the group taught by inquiry approach.

Several other studies (Ezeoba, 2011; Azubike, 2015 and Obih, 2016) confirmed the superiority of the inquiry method over the traditional expository approach in the teaching of biology's; social studies, physics and economics respectively.

The lecture method is a teacher-centered instructional mode that presupposes the teacher to be a sole repository of knowledge and experience, who proceeds to transmit his knowledge to the often passive learners during the teaching-learning process (Azevedo, Grommy & Siebet, 2009). When teaching takes the form of a long talk, address or a speech in which the recipients do very little except to listen attentively and take notes, it is a lecture (Kanno, 2008). The lecture method assumes that lots of what people learn is acquired by the way they are taught in a conceptual way. However, procedural knowledge comes from learning through exposing students to various information, explaining facts and providing demonstration to activities.

Oh (2005) noted that the problem with the lecture method is that it is a means of transferring information in a declarative manner (name, explain and talk about). To Onyekwelu (2000) it consists largely of teaching the child memory without ever appealing to the sense. Its use in the teaching of history may be one of the reasons why many students do not opt for it since it does not challenge them with the task of inquiry. The lecture approach, as it done in our Nigerian schools, lacks animation and fails to use clear illustrations as sufficient visual media. This fact challenges teachers of the subject to explore other productive and result-oriented approaches to make the study of history more interesting to students of today.

Writing on technique of teaching history Akuakanwa (2014) identifies some useful techniques of teaching history to include narration technique, questioning technique, drill, set induction, examination, illustration, questioning, dramatization, assignment, review and supervised study techniques. Some of the above listed techniques have been emphasized by other scholars (Onyemerekeya, 2003; Obih, 2009, Kanno, Obasi and Obih, 2016 and Rob, 2016).

Academic achievement describes the result of a student's performance at the end of an academic programme when tested in the light of the expected objectives of the programme. Agboola and Oyemedede (2007) describe academic achievement as the gain or knowledge of students as a result of taking part in a learning programme. In fact, it is a result-oriented construct that encapsulates the extent to which a programme has been mastered by learners.

Davidson and Kroll (1991) describe academic achievement as the judgment of pupils in a test. They stressed that it is a measurement done using assignments, projects, tests and examinations to assess the worth of students' learning as well as predict how well the students would do in future academic endeavors. Gay, Marsha and Brown (2003) note that academic achievement measure could be oral, written or aptitude tests that measures the current status of an individual with respect to proficiency in given areas of knowledge or skills. Tests and examinations basically serve the purpose of evaluating and predicting the standard of achievement of students in the subject learnt in school.

A major advantage of achievement tests as presented by House (2002) is estimating the relative effectiveness of an innovation. They also clarify areas of weakness in the innovative technique. Students' achievements depend largely on what

the teachers know about the subject they teach and their ability to use various methods to teach increasingly diverse student abilities (Akaraonye, 2011)

In this study, academic achievement can be seen as the measure of student performance after posing through learning with the use of the innovative learner-centered method – guided inquiry approach. We need to know that if students continue to perform poorly, then the cost-effectiveness of the teaching method is in doubt and so would need a review. It is therefore pertinent to determine if the guided inquiry approach would improve students' performance in the study of history in our secondary school.

Gender, according to Azikiwe (2000) describes the psychological, cultural and social dimension of maleness and femaleness. It is a system of roles and relationship between man and women that are determined not biologically but by political, social and economic contexts. It is an analytical concept which emphasizes the sociological roles, cultural expectations and responsibility of men and women (masculine and feminine) in any given society. (Kanno, 2008; Duncan, 2006) The above implies that there are various duties meant for boys and those meant for girls which have resulted to gender stereotype.

Duncan (2006) states that as far as intellectual function is concerned, men and women stand on an equal footing. Both sexes have made significant impacts on the Nigerian socio-economic development, though in some areas, due to deliberate marginalization of women, it would appear that men are taking the upper hand. This can also be seen in the attitude and performance of students' in history which is equally affected by gender.

Some studies have observed some significant sex differences in the performance of students in various subjects. Azubuike (2015) observed significantly differences in the performance of male and female students in the physical and health education; Obih (2016) found no significant sex differences in the achievement of students in economics; Ezeoba (2011) discovered significantly differences in students' performances in social studies while Onuoha-Chidiebere (2014) found no significant difference between the sexes in achievement in mathematics.

2. Purpose of the Study

This study therefore aims at determining the effects of guided inquiry method on academic achievement of secondary school students in history in Imo State, Nigeria. More specifically, the study sought to determine:

- 1) if students taught with guided inquiry method will obtain higher mean achievement scores than those taught with the conventional lecture/expository method; and
- 2) if differences will exist in the mean achievement score of male and female students taught with the guided inquiry methods.

2.1 Research Questions

The following research questions guided the study:

- 1) What is the difference in the mean achievement scores of students taught history with the guided discovery and those taught with the lecture/expository approach?
- 2) What is the difference in the mean achievement scores of male and female students taught history with the guided inquiry method.

2.2 Hypotheses

The following hypotheses were formulated to guide the study:

H₀₁: There will be significant difference in the mean achievement scores of students taught history using guided inquiry method and those taught using lecture/expository method at post-test.

H₀₂: There will be no significant difference between the mean scores of male and female students taught history using guided inquiry method.

3. Methodology

3.1 Design

The study adopted a quasi-experimental design using the pre-test-post-test control group design. It adopted a 2 x 2 factorial design. This involved 2 two teaching methods, (one experimental and one control group). The experimental group was the guided inquiry method and the control group was the expository/lecture method. One dependent variable (achievement) and one moderator variable (gender) were involved in the study. A pre-test and post-test were administered to all the groups.

3.2 Subjects

The subjects used for the study comprised a total of 45 students of the Senior Secondary School 2, registered for history in the West-African Senior Secondary School Certificate Examination in one Secondary School in Imo State, Nigeria.

The students were randomly (using the ballot technique) assigned to the two treatment groups of

- 20 for the guided inquiry method;
- 25 for the lecture/expository method.

3.3 Instrumentation

3.3.1 Development of the Instrument

A 50 item multiple-choice pretest was developed based on the topics that all the students had studied in their previous class-Senior Secondary School 1. The said pretest was constructed by the researchers using a table of specifications to ensure judicious coverage of all the topics studied in the previous year.

Another 50 item multiple choice History Achievement Test (HAT) was developed based on the topics to be taught in the course of the experiment.

The topics were:

- a) Indirect Rule in Northern Nigeria;
- b) Indirect Rule in the Western Nigeria;
- c) Indirect Rule in Eastern Nigeria.

The table of specifications was used to ensure that the test items covered both the topics to be studied as well as the appropriate cognitive levels that the questions ought to target.

The face and content validations of the instrument (HAT) were undertaken by two experts in the areas of curriculum studies and measurement and evaluation; and a history teacher in a school not used for the study.

The reliability of the HAT was established using a test-retest procedure in which the instrument was administered two times to 20 students who were not part of the study in a different school within 3 weeks interval. Using the Pearson's Product Moment Correlation Coefficient Statistics, a reliability index of 0.78 was obtained. This was considered high enough for the study.

3.4 Development of Lesson Plan

Two variants of the same lesson plans covering all the three topics and eight lessons to be taught in the course of the experiment were developed jointly by the researchers and the classroom teachers who were to serve as research assistants to teach using the two different approaches (the guided inquiry method, and lecture/expository methods). Using the lecturers who teach Methodology courses in the Faculty of Education, Abia State University, Uturu, Nigeria, the lesson plans were validated and certified appropriate for the study.

3.5 Training of Research Assistants

The 2 teachers/research assistants were trained in the procedures for carrying out the different teaching methods using the lesson plans as a guide. Their training lasted for one week of three practice sessions until we were confident in their ability to use the different lesson plans. Using two validated checklists of criteria for effective teaching, one, by the guided inquiry method and the other by the lecture/exposition method in rating each on their ability to teach in line with the prepared lesson plans, we became confident of their skills when their scores on the checklists measured up to 70% efficiency level.

3.6 Experimental Treatment

The trained teachers were given appropriate orientation on how to conduct the study with respect to time to teach the classes, the duration of the lessons, the same topics to be taught during each lesson period, the only difference being the instructional method as shown in the lesson plans. Obviously, as a result of the activities involved in the guided inquiry method which included small group tasks, and discussions of data obtained from interviews, their classes often took a longer period than the lecture group. It also involved pre-lesson activities such as internet and library search for

information, and interviews of community elders. The lessons/experimental treatment lasted for four weeks of two lesson periods per week. The lesson plans for the guided inquiry method were used for teaching the experimental group while the lesson plans for lecture method were used to teach the control group.

Efforts were made to control or the intervention of extraneous variables like Hawthorne effect, experimenter bias, non-randomization effect and test instrument effect. At the end of the treatment, data related to the research questions were analyzed using means and standards deviations while those related to the hypotheses were analyzed using the analysis of covariance (ANCOVA).

4. Results

This section presents the analysis of data collected by the researchers for the study. The presentation is done according to the research questions and hypotheses.

4.1 Research Question 1

What is the difference in the mean achievement scores of students taught history with guided inquiry method and those taught with lecture method? The results of analysis of data generated are summarized and presented in Table 1.

Table 1: Mean Achievement Scores of Students Taught History
 With Guided Inquiry and Those Taught with Lecture Method

Source	Pre-test		Post-test		Mean Gains	
	S	X	N	X	S	x
Guided Inquiry	20	17.40	2.37	35.65	4.87	18.25
Lecture Method	25	17.08	1.71	19.48	5.88	2.4

The result presented in Table 1 shows that students taught History with guided inquiry had pre-test achievement mean score of 17.40, post-test mean score of 35.65 and mean achievement gain score of 18.25, while those taught with lecture method had pre-test achievement mean score of 17.08, post-test mean score of 19.48 and mean achievement gain score of 2.4. This result indicates that students taught with guided inquiry achieved higher mean score than those taught with lecture method at post-test. This implies that guided inquiry is an effective method of teaching history in secondary school.

However, the test of the corresponding hypothesis will establish whether or not the observed difference is statistically significant.

4.2 Research Question 2

What difference exists in the mean achievement scores of male and female students taught history with guided inquiry method? The results of analysis of data generated are summarized and presented in Table 2.

Table 2: Mean Achievement Scores of Male and Female Students
 Taught History with Guided Inquiry Method

Source	Pre-test		Post-test		S
	N	X	S	X	
Male					
Female	9	18.00	2.60	37.11	5.37
Female	11	16.91	2.16	34.45	4.30

The result presented in Table 2 above shows the difference in the mean achievement scores of male and female students taught history with guided inquiry method. The result reveals that male and female students taught History with guided inquiry method had post-test mean achievement scores of 37.11 and 34.45 respectively. This result indicated that the male students had higher mean scores than the female students. That is to say that the male students appear to have performed better than the female students taught History with guided inquiry method.

However, the testing of the hypothesis would establish whether the difference in the mean scores is statistically significant.

3.3 Hypothesis 1

There is no significant difference between the mean achievement scores of students taught history using guided inquiry method and those taught with lecture method at the post-test.

Hypothesis one was tested with analysis of covariance (ANCOVA) in Table 3.

Table 3: Summary of Analysis of Covariance for the Pre-test and
 Post-test Scores of Guided Inquiry and Lecture Groups ($p < 0.05$)

Dependent Variable: Post Test					
Source	Type III Sum of Squares	Df	Mean	F. cal	Sig.
Corrected model	2917.801 ^a	2	1458.900	48.392	.000
Intercept	606.860	1	606.860	20.130	.000
Pre-test	12.591	1	12.59	.418	.522
Teaching methods	2917.200	1	2917.200	96.764	.000
Error	1772.968	42	30.148		
Total	63683.00		45		
Corrected total	4184.000 44				

a. R Squared = .697 (Adjusted R Squared = .683)

Results in Table 3 revealed that the F-calculated value is 96.762 and the p-value of 0.000 is less than 0.05 level of significance ($p < 0.05$), indicating that there is a significant difference between the mean achievement scores of students taught history with guided inquiry method and those taught with lecture method. Hence, the null hypothesis is rejected. This implies that students taught with guided inquiry method performed significantly better than those taught with lecture method on the same History Achievement Test.

3.4 Hypothesis 2

There is no significant difference between the mean achievement scores of male and female students taught history using guided inquiry method at the post-test.

The results of analysis of data generated are summarized and presented in Table 4.

Table 4: Analysis of Covariance (ANCOVA) for Test of Hypothesis 2
 (Tests of Between-Subjects Effects)

Dependent Variable: Post Test					
Source	Type III Sum of Squares	Df	Mean	F. cal	Sig.
Corrected model	48.103 ^a	2	24.052	1.016	.383
Intercept	283.061	1	283.061	11.957	.003
Pre-test	13.170	1	13.170	.556	.466
Guided Inquiry	.000	0	.	.	.
Gender	23.940	1	23.940	1.011	.329
Guided Inquiry	.000	0	.	.	.
Error	402.447	17	23.673		
Total	25869.000	20			
Corrected total	450.550	19			

a. R Squared = .238 (Adjusted R Squared = .166)

Table 4 shows the analysis of covariance (ANCOVA) for test of hypothesis 2. The F-calculated (F-cal) value of 1.011 and the p-value of 0.329 which is greater than 0.05 level of significance, indicating that there was no significant difference between the mean achievement scores of male and female students taught history using guided inquiry.

5. Discussion of Findings

The study revealed that guided inquiry is an effective method of teaching history in secondary schools. This implies that guided inquiry strategy is also a good instructional method, and that it can be used to improve students' performance in History. In line with this finding, Azubuike (2015) result showed that the mean post-test scores showed a wide difference between the academic achievement of students taught with guided inquiry method and those taught with lecture method. There was a significant difference between the achievements of student taught with guided inquiry and those taught with lecture method in favour of guided inquiry. Hence, guided inquiry proved more effective than lecture method in enhancing students' academic achievements. The result is also in consonance with that of Ezeoba's (2011) which showed that achievement score of students taught with guided inquiry method in pretest increased in the post-test indicating a higher mean gain. This indicates that students taught with guided inquiry performed significantly and participated better than those taught with lecture method. The study concluded that guided inquiry method impacted students' achievement more than traditional lecture methods.

It was further revealed that there is no significant difference between the mean achievement scores of male and female students taught history using guided inquiry method. This implies that significantly, the performances of the two groups are not different. In accordance with this finding, Ezeoba (2011) result indicated that there was no significant difference between the mean scores of male and female students. Obih (2016) results revealed that a significance difference does not exist in the male and female students' academic achievement. The equivalence in the performances of male and female students suggests that activities produce similar results irrespective of gender. When learners are engaged in activities that are meaningful to them, both male and female students benefit equally.

One significant curricular implication of the utilization of the guided inquiry approach pertains to the preparation of the lesson timetable especially in both private and public schools in Imo state. In primary and junior secondary schools, the lesson timetables provide for 30 and 35 minutes duration for lower and upper basic education classes respectively, while in senior secondary schools 1-3, the lesson period lasts for forty (40) minutes. Such lesson periods are definitely too short for meaningful learning activities to be undertaken in most school subjects. For learners to be fully engaged in a learning activity, the teacher needs to have planned the said activity along with the learners and this planning takes time. After performing the activity, sometime is needed to link the said activity with the day's lesson objectives because activities are not undertaken in isolation of the lesson objectives. All these can hardly be effectively accomplished within the lesson period in its present form. This largely explains the preponderance of the expository method among primary and secondary school teachers.

Another implication of the findings is the need to reorientate our teachers from the traditional, expository/lecture/teacher-talk approach which is prevalent as a teaching approach in most of our schools to the learner-centered approach. We know that many of our teachers were trained to teach with the traditional teacher-centered methods. However governments, both at the federal and state levels, have invested funds substantially in the retraining of teachers along the modern learner-centered methods but it would appear that the old tradition is difficult to get rid of. In fact, the teachers that apply the expository approach feel justified by the fact that a lesson period of 30 to 40 minutes is certainly too short for any meaningful learning activity to be cooperatively planned and undertaken by the class and teacher. The lecture approach therefore becomes to them, the more realistic approach. We therefore call on the education authorities in Imo state of Nigeria to do the needful by creating enough time in the lesson timetable for useful activities to be undertaken by teachers and their class pupils and students.

6. Conclusion

The study has shown that the learner-centered, activity-oriented instructional approach results in improved students' academic achievement. It has also confirmed that both

boys and girls can benefit equally from the use of the activity-oriented method. We know that teachers are key to the attainment of instructional objectives. As a result, we need to reorient our teachers towards the use of activity-based instructional approaches as against the traditional teacher-centered procedure. In doing so realistically, the duration of periods in the lesson timetables have to be modified from the present 30 minutes for the lower basic (primary 1-3), 35 minutes for upper basic (primary 4-6 and Junior secondary 1-3), and 40 minutes for Senior Secondary School (1-3) to at least 50 to 60 minutes for each of the class levels. We are optimistic that if we implement the above recommendation about retraining our teachers to use appropriate methods and modify the duration of our lesson timetables, there will be improved students' academic achievement in our Nigerian schools.

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