

Process Oriented Guided Inquiry Learning and Academic Achievement of Secondary School Economics Students in Ogun State

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Abstract. The study investigates Process Oriented Guided Inquiry Learning and academic achievement of secondary School economics students in Ogun State. The study employed quasi- experimental research designs. Four research questions and one hypothesis tested at 0.05 Alpha levels guided the study. A sample of two hundred and twenty (220) senior secondary economics students and twenty (25) economics teachers were drawn from the population through stratified random sampling technique. Four schools were randomly selected from four local government Areas and fifty-five SSS II students in each school were randomly assigned to the control and experimental groups. The data for the study was collected using a researcher- designed Questionnaire which was validated by experts in social sciences education and the Economics Achievement Test (EAT) that was adopted from Lagos State Ministry of Education 2nd and 3rd term unified examination held in 2013 & 2015 respectively. The reliability of the instrument was established (0.81) using Pearson's Product Moment Correlation Analysis to establish the consistency of the instrument. Data collected were analysed using mean, standard deviation and t- test. The result shows that most of the students are of the opinion that learning economics is very interesting and therefore look forwards to economics classes. Thus, the students exhibited positive attitude towards teaching and learning economics. The findings also, shows that secondary school economics teachers opined that the students have attitude of often absenting themselves from school and also come late school. Lastly, the result revealed that process oriented guided inquiry learning significantly affect the performance in economics of secondary school students in the study area. The students exposed to PROGIL learning performed better (mean score =55.03) in economics when compared with the traditional teaching method (mean score=50.45). The two mean scores were statistically different in favor

of POGIL, using t-test at 0.05 level of significance. Conclusively, POGIL as a teaching strategy enhances teamwork, critical thinking and problem solving skills in the students; which are pre-requisites for career growth and development. Based on the findings, there is a need for motivation to encourage students' regular attendance and early coming to school to have positive disposition to learning. The study recommends that POGIL as an instructional strategy must be encouraged in secondary economics classes as it was found to enhance academic achievement. The conventional method presently in use by secondary economics teachers can as well be improved upon or modified to improve secondary school students' academic achievement.

Keywords: Economics, Process Enquiry Oriented Guided Learning, Team-work, Academic Achievement

1. Introduction

Inquiry-based learning includes any method whereby students discover knowledge without being explicitly instructed. Students are presented with a challenge and accomplish the desired learning in the process of responding to that challenge (Jasperson, 2013). The teacher may guide the students in the right direction, but the students explore and make discoveries. The role of the teacher is a facilitator of knowledge acquisition rather than the primary source of knowledge. The teacher's role is to design appropriate inquiry experiences.

According to Wikipedia, POGIL is a student-centered, group-learning instructional strategy. It is a teaching method based on cooperative learning, constructivism, and the learning cycle. The activities follow the structure of learning cycle of exploration, concept invention and application. The method works

on the basis that students who are actively engaged in the learning process understand complex concepts to a deeper level than those students who remain passive in the learning process—such as with the teacher-centered, lecture-dominant traditional pedagogy. (Barthlow and Watson, 2014). POGIL also emphasizes collaboration among students. A typical POGIL lesson may begin with a short introductory lecture of not more than ten minutes. Students then meet with their groups to discuss the topic introduced in the brief lecture. After a prescribed period for that lesson, the teacher calls the students' attention to the whole class. Each group gives a report of what they have learned or discovered regarding the POGIL activity. Groups then return to their work on the activity. The teacher circulates among the groups to help only when requested. The lesson concludes with the groups sharing what they've learned with the rest of the class. While the teacher guides the lesson by supplying a short background at the beginning and guided questions to steer the inquiry, the students are responsible for what they learn. The effectiveness of POGIL in science courses has been reported by various researchers. (Straumanis, 2004), Minderhout and Loertscher, 2007), Lewis and Lewis, 2008), Schroder and Greenbowe, 2008) and Brown, 2010). The strategy, as explained in the study of (Jasperson, 2013) is a process of discovery learning that is driven not by the memorization of concepts typically stored in short-term memory, but the asking of open-ended questions that opens dialogue between other students and the instructor. Students use prior knowledge as a building block for linking old ideas with new concepts. Through this open dialogue, misconceptions are identified and discouraged, so that the students' understanding can be identified and corrected. It is essential that the instructor provides opportunity for the students to further question, investigate, and allow time to build a new body of knowledge. Students must not only learn fundamental subject concepts, but also develop skills for problem solving and critical thinking using the process of inquiry. A common belief among educators is that inquiry based instruction was a tool used to teach process skills and not content. Consequently, educators have relied upon cookbook laboratories, worksheets and other teacher-centered activities to teach basic contents. Additionally, many teachers had little or no training and have not been successful at teaching inquiry-based instruction and have abandoned the idea, reducing learning to memorizing a set of facts, limiting the students of the rich opportunity to actively solve problems independently. Guided inquiry prepares students for

lifelong learning by using methods that promote a deeper understanding of contents.

Given (2002) opined that the formation of long-term memory requires more than just participating, but actively processing as well. Given identifies five natural learning systems of the brain that can store information. These include cognitive, emotional, social, physical and reflective learning. It was concluded that the more natural systems that students use to learn, the higher the likelihood that long-term memory will occur.

Many teachers choose not to use a student-driven approach in their classes because of lengthy class time involved in completing a lesson or concept. However, students' achievement is affected by different factors such as teaching methodology, learning abilities, study habit, learning style, previous knowledge, race, and gender (Hanson, 2005).

The use of appropriate teaching method incorporates an ordered way of accomplishing an end or performing a task. Adu and Adeyanju (2013), described methods as systematic patterns to be followed in the teaching/learning process to drive home a point. Whether in formal or informal education, teaching method effectiveness makes for retention of learnt concepts. The extent to which an instructional procedure is potent depends greatly upon its effective use by the instructor and the impression it leaves on the learner, which is usually evident in their attitude as well as performance. The ability of the teacher to impart knowledge so depends greatly on the method he applies during the teaching-learning process. Umoren, 2001). Where the method is defective, the students stand to lose as they do not benefit from lessons.

Academic performance of students is a measure of success of academic process. According to Hanson (2005) the objectives of POGIL are to engage students to take ownership of learning, encourage students-students and students-instructor interactions thereby developing process skills in the areas of learning, thinking and problem solving. The method develops supporting process skills in teamwork, communication management and assessments that are essential for the work place.

2. Statement of the Problem

Improvement in the teaching and learning of economics in secondary schools in recent decades is of great importance. How the subject is taught and learned appear very much under-researched in many

parts of the world (Jephcote, 2004). The available evidence from the last few years shows that passive learning based on traditional methods of “chalk and talk” seems to be the most widely used teaching method, characterizing the 20th century style of economics teaching (Siegfried, Saunders, Sonar, & Zhang, 1996, and Benzing & Christ, 1997). It has been discovered that most students who have completed a secondary course in economics exhibit significant deficiencies in their knowledge of economics (Walstad and Soper (1988).

However, the studies of Kuhn, Black, Keselman, & Kaplan (2000) discovered that POGIL allows students to apply content knowledge while trying to solve real world problems through peer-collaboration and therefore, suggests that it may be used to develop cognitive skills across the hierarchy of Bloom’s taxonomy and so affect academic performance as reflected by students’ grades. Becker & Watts (2006), questioned the aims and effectiveness of economics teaching over the years. It is noted that lack of content knowledge and skills among the graduates and their inability to perform effectively in workplaces raised deep concerns among parents, teachers, business communities, teacher educators and researchers.

In the study area, little or no empirical study on the extent to which the POGIL has been used in the teaching and learning of economics in the study area is known. It is therefore, becomes necessary to focus research work on improving teaching and learning economics in the study area as a way of improving students’ performance in the subject. Hence, this study seeks to investigate the Process Oriented Guided Inquiry Learning in secondary school economics students and academic achievement in Ogun State.

3. Purpose of the Study

The purpose of this study is to assess the effects of process oriented guided inquiry learning on secondary economics students’ academic achievement in Ogun State.

Specifically the objectives are to:

- Examine the opinion of secondary school economics students on learning economics?
- Investigate the opinion of economics teachers on the attitudes of secondary economics students.
- Ascertain the opinion of Secondary School Economics Students Exposed to Process Oriented Guided Inquiry Learning.
- Examine the effects of process oriented guided inquiry learning on the academic

achievement of secondary school economics students in Ogun state.

4. Research Questions

- What is the opinion of secondary school economics students on learning economics?
- What is the opinion of economics teachers on the attitude of secondary school economics students?
- What is the opinion of Secondary School Economics Students Exposed to Process Oriented Guided Inquiry Learning?
- What are the effects of process oriented guided inquiry learning on the academic achievement of secondary economics students in secondary schools in Ogun state.

5. Hypothesis

Process oriented guided inquiry learning has no significant effect on the academic achievement of Secondary School Economics Students in Ogun state.

6. Methodology

This study adopts quasi- experimental designs. The study were carried out in four (4) Local Government Areas (LGAs) selected randomly out of the twenty (20) LGAs of Ogun State. Population of the study was made up all senior secondary school economics students and teachers in Ogun State. Multistage simple random sampling were used for the selection of four (4) secondary schools, twenty (25) economics teachers and two hundred and twenty (220) senior secondary economics students. This method was adopted to give every student and teacher an equal opportunity to participate in the study without any form of discrimination. The students were divided into two groups A and B. Group A is the experimental group while the group B is the control group. The two groups A and B were taught some selected four topics in economics; covering SSS 2 scheme of work in second term. Group A, being the experimental group was exposed to Process-Oriented Guided Inquiry Learning (POGIL) on each of the four topics while the control group B was taught using the traditional teaching method. The test scores of the control and experimental groups were then subjected to t- test to determine if there is a significant difference the performance due to the use of teaching method of process oriented guided inquired learning.

A researcher made structured questionnaire and Economics Achievement Test (EAT) were used to

collect the data for the study. The achievement test was adopted from Lagos State Ministry of Education 2nd and 3rd term unified examination held in 2013 & 2015 respectively. The test were forty multiple choice items covering some selected Economics topics. The topics included production, demand theory, costs theory and market theory. The test was meant to measure the post-test achievement score after using POGIL.

Economics students' attitude questionnaire employed in Olusola & Rotimi (2012) was adopted for the study. The questionnaire contains two sections A and B. Section A elicits data on respondents' demographic details while section B contains fourteen items focused on the subject matter. The

options available for the respondents range from strongly agree to strongly disagree. The questionnaire were validated by two experts while test split- half method was used to measure the reliability of the instrument. The reliability test gave a correlation coefficient of 0.81, using Pearson's Product Moment Correlation Analysis.

The collected data were analyzed using both descriptive and inferential statistic, using the Statistical Package for Social Science (SPSS) software. Mean, frequency distribution and simple percentage (%) were used for data presentation and interpretation on the demographic data of the respondents and the research questions. Parametric statistics of T-test was employed to test for the relevant hypotheses at 0.05 level of significance.

7. Results

Research Question 1: What are the Opinions of Secondary School Economics Students on Learning of Economics?

Table 1: Opinions of Secondary School Students on Learning of Economics

S/N	Items	SA	A	D	SD	TOTAL
1	We learn interesting things in economics lessons.	86 (39.1%)	77(35.0%)	29 (2.7%)	28 (13.2%)	220 (100%)
2	I look forward to economics lessons.	91 (40.9%)	69(31.1%)	27(13%)	33(15%)	220 (100%)
3	Economics lessons are exciting.	82(37.2%)	89(40.5%)	12(5.5%)	37(6.8%)	220 (100%)
4	I would like to have more economics lessons at school.	90 (40.9%)	71(32.3%)	21 (9.5%)	38 (17.3%)	220(100%)
5	I like economics lessons more than other subjects' lessons.	76(34.55%)	91(41.36%)	35 (15.90%)	18 (8.18%)	220(100%)
6	Economics lessons are boring.	10 (4.55%)	34(15.46%)	77 (35.00%)	99 (45.00%)	220(100%)
7	Economics lessons involving Mathematics are difficult.	48 (21.8%)	21 (9.5%)	101 (46%)	50 (22.7%)	220 (100%)
8	I only fail in economics lessons.	17 (7.7%)	10 (4.5%)	97 (43.7%)	96 (44.1%)	220 (100%)
9	I get good marks from economics lessons.	71 (32.3%)	97 45.0%)	20 (9.0%)	32 (14.5%)	220 (100%)
10	I easily learn economics topics	81 (36.8%)	90(40.9%)	13 (5.9%)	36 (16.4%)	220(100%)
11	I feel helpless when doing economics homework.	81 (36.8%)	79(33.7%)	32 (14.5%)	33 (15%)	220(100%)
12	I understand everything taught in economics lessons	100 45.5%)	69 31.4%)	22 (9.9%)	29 (13.2%)	220(100%)
13	I feel bored when economics lesson is ongoing.	19 (8.6%)	44 (20%)	79 (35.9%)	78 (35.5%)	220(100%)
14	I usually get scared when economics lecture is ongoing	45 (20.5%)	20 (9.1%)	89 (40.4%)	66 (30%)	220(100%)

Table 1 shows that 163(74.1%) of the respondents agreed that they learn interesting things in economics lessons while 57(25.9%) disagreed. This means that teaching economics is interesting. The study further shows that the teacher used this study to design suitable methods of teaching and to make the subject they teach relevant, interesting and meaningful to the learners. 160(72.0%) of the respondents agreed that they look forward to economics lessons while 60(28.0%) disagreed. 171(77.7%) of the respondents supported that economics lessons are exciting while 29(22.3%) of them opposed. The above table shows that 161(73.2%) of the respondents corroborated that they would like to have more economics lessons at school and 59(26.8%) of them contradicted with the statement. The table also revealed that 167(75.91%) of the respondents agreed that they like economics lessons more than other subjects' lessons while 53(24.01%) disagreed. Most students 176(80.0%) disagreed that economics lessons involving mathematic are difficult while 44(20.0%) of the respondents agreed. Moreover, 69(31.36%) of the respondents supported that economics lessons are difficult while 151(68.64) of them opposed. The statement that 'i only fail in economics lessons' was supported by 27(12.2%) and 193(87.8%) opposed the statement. Furthermore,

168(76.5%) of the respondents claimed that they get good marks from economics lessons while 52(23.5%) of them denied. About 171(77.7%) of the respondents affirmed that they easily learn economics topics while 49(22.3%) disagreed. The results also show that 65(29.0%) of the respondents affirmed that they feel helpless when doing economics homework while 155(71.0%) of them disagreed. The statement that ‘I understand everything taught in economics lessons’ was supported by most students; 169(76.9%) while 51(23.1%) opposed as shown on the table. Also, 63(28.6%) of the respondents supported that they feel bored when economics lesson is ongoing while most students 157 (71.4%) opposed. Finally, the result shows that 65(29.6%) of the respondents supported that they usually get scared when economics lecture is ongoing while most students 155(70.4%) opposed.

Research Question 2: What is the opinion of economics teachers on the attitude of students learning economics?

Table 2: Teachers opinion on the attitude of economics students

S/N	Items	Often	Sometimes	Rarely
1	How often do your students come to school late?	23(92%)	2(8%)	0(0%)
2	How often do your students absent themselves from school?	13(52%)	10(40%)	2(8%)
3	How often do your students do their class exercises?	24(96%)	1(4%)	0(0%)
4	How often do your students participate in class lessons?	25(100%)	0(0%)	0(0%)
5	How often do your students participate in extra lessons in the school?	17(68%)	7(28%)	1(4%)
6	How often do your students use Local language to communicate among themselves during class lessons?	17(68%)	5(20%)	3(12%)
7	How often your students are motivated to study?	12(48%)	13(52)	0(0%)

The result indicates that most secondary school teachers 32(92%) are of the opinion that economics students at secondary school level often come to school late and often absent themselves from school. However, the respondents 24(96%) opined that the students do carry out their school exercises and participate in class lessons and also in extra classes in the school. Meanwhile, the students use local languages to communicate among themselves but they are sometimes motivated to study.

Research Question 3: What is the opinion of Secondary School Economics Students Exposed to Process Oriented Guided Inquiry Learning?

Table 3: Opinion of Secondary School Economics Students Exposed to Process Oriented Guided Inquiry Learning

S/N	Items	Agreed	Disagreed	TOTAL
1	Teachers use' of process oriented guided inquiry learning experience during lessons encourages class attendance	49(44.55%)	61(55.45%)	110(100%)
2	Teachers' use of process oriented guided inquiry learning experience in classroom attracts students' attention to the lessons.	52(47.27%)	58(52.73%)	110(100%)
3	Students feel relaxed when teachers use process oriented guided inquiry learning experience during lessons and don't hesitate to ask them a lot of questions.	37(33.64%)	73(66.36%)	110(100%)
4	Process oriented guided inquiry learning experience makes lessons more enjoyable and alleviates the boredom.	68(61.82%)	42(38.19%)	110(100%)
5	Process oriented guided inquiry learning experience helps students to remember the gained knowledge	63(57.27%)	47(42.73%)	110(100%)

The result (Table 3) shows that most students 61(55.45%) disagreed that teachers use of process oriented guided inquiry learning experience during lessons encourages class attendance while 49(44.55) agreed with the statement. Likewise, most participants 58(52.72) disagreed that teachers' use of process oriented guided inquiry learning experience in classroom attracts students' attention to the lessons while 52(47.27) agreed. Also ,the result indicates 73(66.36) agreed that students feel relaxed when teachers use process oriented guided inquiry learning experience during lessons and don't hesitate to ask them a lot of questions while 37(33.64%) participants agreed.

Furthermore, most students 68(61.82%) agreed that process oriented guided inquiry learning experience makes lessons more enjoyable and alleviates the boredom but 42(38.19) participants disagreed. Finally, 63(57.27%) of the participants agreed that Process oriented guided inquiry learning experience helps students to remember the gained knowledge while 47(42.73) disagreed.

Research Question 4: To what extent does process oriented guided inquiry learning affect the performance in economics of secondary school students in Ogun state?

Hypothesis 1: process oriented guided inquiry learning does not significantly affect performance in economics of secondary school students

Table 3: Mean rating, Standard Deviation and t-test Analysis of Influence of effect of process oriented guided Inquiry Learning on Economics Students’ Performance

Group	N	X	SD	Df	t- cal	t-crit	Decision
Students taught with traditional chalk and talk teaching method	110	50.45	9.21	218	7.14	1.96	Significant
Students taught with process oriented guided inquiry learning	110	55.03	8.49				

Alpha level 0.05

Table 2 revealed that the mean scores of the control class and the experimental class were 50.45 and 55.03 respectively. A comparison between these two mean scores shows there were differences between them in the favour of the students exposed to process oriented guided inquiry learning. When the two means were statistically compared using t-test at 0.05 level of significance and degree of freedom 218, a calculated t value of 7.14 was obtained. This was higher than the t critical value of 1.96. Therefore the null hypothesis which states that there are no significant effects of process oriented guided inquiry learning on the performance in economics of students in secondary schools in Ogun state is hereby rejected indicating that process oriented guided inquiry learning significantly affect academic performance in economics among secondary students in Ogun State.

8. Discussion of Findings

The study examined the effect of process oriented guided learning on the academic performance in economics of senior secondary schools in Ogun State. The result shows that majority of the students have positive attitude towards teaching and learning of economics. This is an indication that the students can easily adopt new teaching methods.

Based on the opinion of economics teachers on the attitudes of students towards learning economics, the result shows most of the teachers that participated in the study are of the opinion that the students carry out their school exercises, participate in class lessons and extra classes. However, the negative attitudes include late coming to school and often absence from class. This negative attitude to study can have a negative influence on their academic performance. This finding is consonance with the work of Allen-Meares, Washington and Welsh (2007) who found that poor attendance caused by truancy or unexcused absence from school, cutting classes and leaving school without permission is important in determining pupil’s academic performance.

Furthermore, the findings revealed that most secondary school economics students are of the

opinion that even though the POGIL does not necessarily encourage class attendance and relaxation, they found the class enjoyable as the strategy helps the students to remember the gained knowledge. This implies that the students found POGIL helpful in their studies. This is in accordance with the study of (Widyaningsih, 2012) that students taught with POGIL were able to develop their skills, possess higher level of thinking and metacognition, communication, teamwork, management, and assessment and no longer rely on rote Learning thereby developing skills for success in learning.

Lastly, the result revealed that process oriented guided inquiry learning significantly affect performance in economics of secondary school students. The students exposed to PROGIL learning performed better in economics when compared with the traditional teaching method). Most of the materials learned in schools consist of concepts; and these are very important in learning process. Also, Hardini (2017) shows that the implementation of inquiry method is able to increase students’ participation and achievement. The study of Kuhn, Black, Keselman, & Kaplan, (2000) also discovered that POGIL allows students to apply content knowledge while trying to solve real world problems through peer-collaboration and therefore, suggests that it may be used to develop cognitive skills across the hierarchy of Bloom’s taxonomy and so affect academic performance as reflected by students ‘grades.

9. Implications of the Findings

The implications of the study findings suggest that as students displayed positive attitude towards learning economics in secondary schools, they could be motivated for career choice in economics in higher institutions of learning. This will increase human capital development in the economic sector and thus enhance their contributions to the economic development of the country.

The POGIL has positive effect on academic achievements of secondary school economics students when compared to the traditional teacher –

centered method. Thus, the method would be a better teaching-learning approach in secondary schools.

10. Recommendations

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

The utilization of POGIL as an instructional strategy must be encouraged in secondary economics classes as the method was found not only enhancing the student-material interaction, but also the instructor-student interaction.

Secondary school teachers must pay attention to small group instruction and management to enhance cooperation and foster positive interdependence. Groups of three or four students tend to be more effective when group assignment is diverse and made by the instructor.

The use of conventional method of instruction in formal schools had been empirically discovered in this study to be less potent and less effective than POGIL mode of teaching in secondary schools, therefore, the conventional method presently in use by secondary economics teachers should either be improved upon, modified or replaced with an activity-based teaching approach such as POGIL. However, there is a need for motivation to encourage students' regular attendance and early coming to school.

11. Conclusion

Based on the findings of this study, it can be concluded that Process Oriented Guided Inquiry Learning activities is more potent in stimulating students' attitude towards economics in secondary schools than the currently used conventional method in the nation. The findings showed that POGIL approach enhances students' achievement in learning economics. POGIL as a teaching strategy promotes teamwork, critical thinking and problem solving skills in the students which can promote career growth and thus contribution towards national economic development in the future.

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