Effect of Heuristic and Dalton Laboratory Plan on Students Academic Achievement in Social Studies

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Abstract
The study examines the effect of Heuristics and Dalton laboratory plan on student academic achievement in social studies. A total of 448 students both male and female from Jss 2 participated in the study. The study employed a quasi experimental design. The instrument used for data collection was social studies achievement test (SOSAT) which was subjected to a split-half method and reliability co-efficient of 0.072 established the data gathered fro m the study were subjected to ANCOVA, mean and standard deviation. The result of the study revealed that there was a significant difference between students taught using Heuristic and Dalton laboratory plan and those taught using lecture method, and that there was no significant difference in the mean achievement test of male and female students in social studies. The study therefore recommends that teachers of social studies should employ the use of Heuristic and Dalton plan to facilitate easy teaching and learning of social studies.

Introduction
The acquisition of knowledge at all level of education depends on teaching effectiveness measured in terms of knowledge of what to teach, how to teach and when to teach.The quest for better strategies and techniques of teaching has been emphasized as a basis for student achievement in various subjects Akone (2012), Aggarwal (2006).

A method of teaching however has been linked upon as a body of fixed and stereotyped models of procedures according to Hanior and Tukur (2014) each applicable to its appropriate subjects as a kind of ritual to be observed by all teachers and in all circumstances. A teaching method link up the teacher and his pupils into an organic relationship with constant mutual interaction.

The teachings that go on in most of our schools are dominated by verbalism and delusion. The teacher's duty should be to ensure that teaching method is employed to create fresh environment and interest to the students.

The chalk and talk method has been mostly used by teachers of social studies. Barron and Hurakiewiez (2001) assert that one need to be motivated for greater achievement in education.

Heuristics and Dalton laboratory plan are among many other methods not often used by teachers.

Heuristics method according to Aggarwal (2006) is a method in which children discover and find things for themselves and are placed in the position of discoverer or inventors. He maintained that students who are taught in the way learn to be observant, exact and to think for themselves. Social studies according to Kissock (1981) is a programme of study which society uses to instill in students the knowledge, skill, attitude and actions it considers important concerning the relationship human beings have with each other, their world and themselves. Heuristics method if properly adopted by social studies teachers will help students discover the nature of human beings, the world and themselves.

The Dalton plan is also known as Dalton laboratory method, because laboratories replace classrooms, advocates of the Dalton plan according to Onwuka (1996) maintained that class-groupings is mainly for convenience, and not for instruction. The classroom is seen as an educational workshop equipped with books, maps, drawings, photographs, and other materials that will enable each students with little assistance as possible, to complete the work which it is suggested that he should do. The main features of the Dalton plan is assignments or contracts, subject teachers, subject laboratories, records and conferences. In a social studies class for instance, there are no classrooms instead there is a social studies laboratory, equipped with all materials of study and work that the students in social studies need. At any given time, students from all JSS 2 years of secondary school social studies may be working individually in the social studies laboratory, the teacher of social studies remain the social studies laboratory assistant as students need it. The justification for the Dalton plan according to Onwuka (1996) is that each student has individual needs which can be satisfied by working alone. The plan enhances the acquisition of cognitive knowledge's, attitudes, value and skills in rational thinking which are relevant in social studies.

PURPOSE OF THE STUDY
The purpose of this study is to examine the effect of Heuristics method and Dalton laboratory plan on student's academics achievement in social studies.

Research Questions
1.   What is the difference in mean achievement of students taught using Heuristics and Dalton plan method and those taught using the lecture method.
2.   What is the mean difference between male and female students taught using Heuristics and Dalton plan.

Hypotheses
The hypotheses were formulated and tested at 4.45 level of significance (P.<0.05).
1.   There is no significance difference in mean achievement between students taught using Heuristics and Dalton plan and those taught using lecture method.
2.   There is no significant difference in the mean academic achievement test of male and female students in social studies, when taught using Heuristic and Dalton plan method.

METHOD
The design for the study is a quasi experimental design. The non-equivalent control group design. The reason for the choice of this design is the fact that it does not involve randomization of the participating unit as is the case in most experimental designs Ezeh (2005).

The target population for the study comprised all the 3448 social studies students of public Junior Secondary schools in Lafia township schools during the 2013/2014 academic session. JSS 2 students were selected for the study. The number of JSS students is 448. Ministry of education data bank (2013) Intact class approach was adopted, only those students who are regular and constant in the classes were used at the end of the treatment. The two experimental group the Heuristic and Dalton laboratory plan and control group made up the 448 students sample. The student covered a period of Six weeks. During the first two weeks the control group teacher was trained to be able to effectively handle the lecture method approach. The experimental group which utilized Heuristic and Dalton plan was handled by the researcher.

The instrument that was used for data collection was the social studies achievement Test (SOSAT) which was developed by the researcher and had questions that covered some selected topics on Nigeria mineral resources and their uses. The SOSAT was validated by experts in curriculum and instruction and two social studies specialist to ensure face and content validity.

The reliability of the instrument was subjected to split half method and a reliability co-efficient of 0.72 was established.

The JSS 2 students were grouped into the control group 1 and 2 and the experimental group 1 and 2. the SOSAT was given to them as pretest. The experimental groups were taught using the heuristics and Dalton laboratory plan respectively. However students in the control group were taught using the lecture method only. The two groups were taught the same content for Six weeks. At the end of these Six weeks usually referred to as the treatment weeks, SOSAT was again administered to JSS 2 social studies students in the groups to analysis of covariance (ANCOVA)

RESULTS AND DISCUSSIONS
The data gathered from the study were analyzed by subjecting them to mean and standard deviation to answer research questions.

For research question one, data gathered on achievement of control and experimental groups were analyzed by subjecting them to mean and standard deviation to answer the research question one is presented in Table 1.

Table 1: mean gain scores of students taught using Heuristic and Dalton laboratory plan, and lecture methods

Group	N	Pretest		Posttest		Mean gain
		Mean	Std Deviation	Mean	Std Deviation	
Lecture	228	2.4956	1.14768	11.4561	3.93928	8.9605
Heuristic and Dalton lab plan	220	2.5318	1.18741	12.7455	3.79963	10.2137

Table 1: shows mean gain scores of students taught using Heuristic and Dalton laboratory plan, and lecture methods. It seen that 228 students in Lecture method have pretest mean score of 2.4956 with standard deviation of 1.14768 while 220 students in Heuristic and Dalton lab plan have mean score of 2.5318 with standard deviation of 1.18741. At the posttest, the 228 students in Lecture method have pretest mean score of 11.4561 with standard deviation of 8.9605 while their 220 counterparts in Heuristic and Dalton lab plan have mean score of 12.7455 with standard deviation of 3.79963. The mean gain Lecture method is 8.9605 while that of Heuristic and Dalton lab plan is 10.2137. The difference in mean achievement of students taught using Heuristics and Dalton plan method and those taught using the lecture method is 1.2532 in favour of the Heuristics and Dalton plan method.

For research question two, data gathered on achievement of male and female students were analyzed by subjecting them to mean and standard deviation to answer the research question two is presented in Table 2.

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Table 2: mean gain scores of male and female students taught using Heuristic and Dalton laboratory plan.

| Group | N | Pretest | | Posttest | | Mean gain |
		Mean	Std Deviation	Mean	Std Deviation	
Male	164	2.5244	1.20557	12.6463	3.80465	10.1219
Female	56	2.5536	1.14288	13.0357	3.80413	10.4821
Total	220					

Table 2: shows mean gain scores of students taught using Heuristic and Dalton laboratory plan. It seen that 164 male students in Lecture method have pretest mean score of 2.5244 with standard deviation of 1.20557 while 56 female students in Heuristic and Dalton lab plan have mean score of 2.5536 with standard deviation of 1.14288. At the posttest, the male students have mean score of 12.6463 with standard deviation of 3.80465 while their 56 female counterparts in Heuristic and Dalton lab plan have mean score of 13.0357 with standard deviation of 3.80413. The mean gain of male students is 10.1219 while that of the female counterpart is 10.2137. The difference in mean of male and female students taught using Heuristics and Dalton plan method is 0.3602 in favour of the female students.

The data gathered from the study were analyzed by subjecting them to analysis of covariance (ANCOVA) to test hypotheses.

For hypothesis one, data gathered on achievement of control and experimental groups were analyzed by subjecting them to ANCOVA between the control and experimental groups.

Table 3: ANCOVA for students taught using Heuristics, Dalton plan and lecture method

Dependent Variable: Posttest scores on SOSAT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4737.757[a]	2	2368.878	494.287	.000
Intercept	2158.963	1	2158.963	450.486	.000
PreSOSAT	4551.635	1	4551.635	949.737	.000
Group	158.578	1	158.578	33.089	**.000**
Error	2132.672	445	4.793		
Total	72346.000	448			
Corrected Total	6870.429	447			

a. R Squared = .690 (Adjusted R Squared = .688)

Table 3: shows ANCOVA of students taught using Heuristic and Dalton laboratory plan, and lecture methods. Reading the row heading Group under the column heading **Sig.,** the associated probability Sig. =.000 =p. since p is less than 0.05, the differenced noticed is significant in favour of Heuristic and Dalton laboratory plan group. So the hypothesis is rejected with conclusion that there is a significance difference in mean achievement between students taught using Heuristics and Dalton plan and those taught using lecture method.

For hypothesis two, data gathered on achievement of male and female students were analyzed by subjecting them to ANCOVA in the experimental groups.

Table 4: ANCOVA for male and female students taught using Heuristics, Dalton plan

Dependent Variable:Posttest scoreson SOSAT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2260.864[a]	2	1130.432	272.293	.000
Intercept	1330.942	1	1330.942	320.591	.000
PreSOSAT	2254.535	1	2254.535	543.062	.000
Sex	4.025	1	4.025	.969	**.326**
Error	900.881	217	4.152		
Total	38900.000	220			
Corrected Total	3161.745	219			

a. R Squared = .715 (Adjusted R Squared = .712)

Table 4: shows ANCOVA of male and female students taught using Heuristic and Dalton laboratory plan. Reading the row heading **Sex** under the column heading **Sig.**, the associated probability Sig. =.326 =p. since p is greater than 0.05, the differenced noticed is not significant. The difference notice is just chance occurance. So the hypothesis is accepted with conclusion that there is no significant difference in the mean academic achievement test of male and female students in social studies, when taught using Heuristic and Dalton plan

method.

CONCLUSIONS AND RECOMMENDATIONS

The study has made realistic effo