EFFECT OF ETHNO BASED INSTRUCTIONAL APPROACH ON STUDENTS' ACHIEVEMENT IN COMPUTER SCIENCE.

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Abstract
The study was on the effect of ethno based instructional approach on students' achievement in computer science. The design of the study was a quasi-experimental design. Two validated instruments were administered. This design was adopted because intact classes were used hence no randomization. The population for the study was all the secondary schools in the Enugu East Local Government Area of Enugu State. The sample size was 317 (160 males and 157 females). In each school used for the study, one intact class was assigned to Ethno based Instructional Approach while the other intact class was assigned to the lecture method of teaching. Mean and standard deviation were used to analyzed the data obtained for research questions while analysis of covariance (ANCOVA) was used to test the hypotheses at alpha level of 0.05. The study revealed that the Ethno based instructional approach is significantly better than the lecture method in enhancing students' achievements in computer science that the lecture method in enhancing students' achievements in computer science, and that method and gender did not produce a combined effect on the means achievement scores obtained by students in computer science. Based on the findings, it was recommended that emphasis on the use of Ethnocomputing teaching materials should be made in the national computer science curriculum for secondary schools, that Nigerian culture (indigenous science) should be a component of our curriculum and that teacher training institutions of learning should include the use of ethnocomputing teaching materials as a method in the computer science course content.

Background

Science and technological studies are important in modern contemporary society and have permeated every aspect of human Adeyanju (2013). A nation's development at any phase is always linked with science and technology and technology happens when there is advancement in science he maintained. The application of facts, theories, laws and principles provided by the study is called technology Ogbu (2005). Iwuozor and Ogbu (2005) observed that science is an area of learning which enhances a Nations development and progress.

Going with the look of things, the current trend in teaching and learning of computer science globally demands conceptual change approach as against the traditional educational method. Teachers in secondary school need to change their approaches to make these approaches more effective and relevant to a much larger proportion of the student population than in the past. Modern knowledge-based economies are so heavily dependent on technology. Porter, Ketels and Deigado, (2007) stated that having a better understanding of science and technology, and better technical problem- solving skills will enable people to meet the challenges and demands of the work place.

Usman and Nwoye (2010) noted that there is need to effectively teach and learn computer in this 21st century to meet the challenges of better knowledge of computing. The use of computer comes with many benefits. Computer makes it possible to empower people who are often overlooked when tools to build revenue and solve business problems are available everyone – it can level the playing field. It accelerates health care progress; Healthcare tends to be a pretty high priority when you consider how to improve people's lives. Genomics and personalized medicine are an excellent example of how computer science-driven technologies are accelerating healthcare progress; Furthering education, e-learning platforms and applications give students new tools to problem-solve and study, which has changed the academic world. The ability to take classes online is also a huge benefit for the world - as it creates access to education for students whose locations, abilities or finances were a barrier. Predicting and avoiding catastrophes, applying computer science to prediction can have a huge impact on the world. We are predicting human behavior; we are predicting human behavior; we are predicting climates, seasons, ocean currents, etc. With these tools, we can predict everything from an incoming tsunami to the outbreak pattern of a pathogen; finally, computer positively impacting every area of the society, computer science is a noble profession without which today's world would come to a complete halt.

Despite the importance of computer listed above, students' performance in external examination in the subject is very poor. For example, analysis of the SSCE computer results shows that though enrolment of the West African Senior Secondary Certificate Examination (WASSCE) and the National Examination Council NECO by candidates may be high, the percentage failure also remained consistently high since year 2012. Both WAEC and NECO have reported low achievement in computer. The Chief Examiner noted in his report that poor performance has become the trend in recent years NECO (2015).

One of the major reasons for this poor performance was attributed to ineffective methods of computer instruction adopted by Nigerian

Secondary School teachers Orji and Ebele, (2006). Nwagbo (2001 reported that reported that teachers shy away from the more effective activity-oriented teaching methods in preference to traditional lecture method which is easy and mostly inadequate and inappropriate. The manner in which computer science subject is presented to students can negatively affect their achievement and there is need to depart from the traditional lecture method of teaching emphasis on socio- cultural environment of the learner. Development of a learning that is cultural complete encourage all individuals – not minding age, gender, ethnicity, religious affiliation socio-economic status, sexual orientation or political beliefs – to develop effective intercultural skills and personal contacts to work harder and achieve better results.

On the other hand, lecture teaching method is a "one-way traffic" type of classroom interaction in which the teacher talks and writes notes on the board while the students listen and copy down notes. Ogbu, (2005) in her study in chemistry observed that lecture method is students listen and copy down notes. Ogbu, (200 that) in her study in chemistry observed that lecture method is a student peripheral teaching approach in which the teacher delivers a pre-panned lesson to the students with or without use of instructional materials. Student participation are minimal and they are not given opportunity to give feedback to the teacher and of course this method has been widely reported as supporting academic achievement of low performing students Okoro, (2011).

Enhancement of computer learning experiences demands that computer science be taught through practical activities using concrete materials Douglas, It (2013). It is in this regard that this study is carried out with ultimate intention to find out the effect of ethno computing teaching materials on students' achievement in computer which will in turn guarantee wealth creation of the individual citizens and national development:

Literature search revealed insufficient research reports on the use of concrete teaching materials such as ethnocomputing teaching materials in teaching computer science concepts Unodiaku, 2012), more literature search revealed insufficient reports concerning influence of sex on student's achievement in computing. It appears that studies on gender differences in computing are inconclusive and need further enquiry in this study to clarify this notion of the students. It is against this background that this study intends to determine the effect of ethnocomputing teaching materials on student achievement in computer science.

Statement of problem.

Computer is very important in so many ways like production, medicine, building; transport etc (Ababio, 2010)

Despite these importances, students achievements in the subject is consistently poor in external examinations. (WAEC 2016), Educators are seeking alternative ways to teach computer science so as to change the situation. The state of affairs has been blamed on the ineffective teaching methods adopted by teachers in impacting scientific knowledge to students. The traditional lecture is not effective enough.

Some studies have established the efficacy of the ethno based instructional methods in computer science teaching and learning. However, there appears to be paucity of research evidence available to the research on the application of such teaching strategy. There is no consensus that senior secondary school male and female students will respond in a similar manner to both ethnocomputing and lecture instructional method on students' achievements in computer science?

Purpose of the study

Was to find out the Effect of ethno based instructional approach on students' achievement in computer science. Specifically, the study tried to determine:

1. the effect of ethnocomputing teaching materials on the mean achievement score of students taught data structure
2. the effect of ethnocomputing teaching material on the mean achievement score of male and female students.
3. the interaction effect of teaching method and gender on student's achievement in computer science.

Research Questions

The following research questions were posed to guide the study.

Ho[1]: There is no significant difference between the mean achievement scores of students taught data structure with ethnocomputing teaching materials and those taught with lecture method.

Ho[2]: There is no significant difference in the means achievement scores of male and female SSE students taught data structure using ethnocomputing materials.

Ho[3]: There is no significant interaction between teaching methods and gender on students' achievement in Computer Science?

Research Method/Design

The design of the study was quasi-experienced research design. Specifically, the design is pretest-posttest non-equivalent control group design. The study was carried out in Enugu East Local Government Area of Enugu State.

The population for the study comprised all the two thousand eight hundred and fifty-one (2851) Senior Secondary School class one (SSI) students made up of 1416-educational males and 1433 females, who offer computer science in

all the co-educational secondary schools in Enugu East Local Government Area. The samples for the study were 317 computer science students selected from four (4) secondary schools. For the ethnocomputing method (experimental group), a total of 160 (80) males and 80 females SSI computer science students were used, while the lecture method comprised of 157 (77 males and 80 females) computer science students.

The instrument used for data collection was called Ethnocomputing Achievement Test (ETHNOCOMAT). The ETHNOCOMAT was a forty item instrument consisting of multiple-choice questions. The time allowed was one hour thirty minutes. The ETHNOCOMAT faced two forms of validation – face and content validations. Mean and standard deviations were used in answering the research questions. Research hypotheses posed were tested using the analysis of covariance (ANCOVA) at P 0.05 significant level.

Result

The results of the study were presented in accordance with the research questions and hypotheses.

Research Questions I:

What is the difference between the mean achievement scores of students taught data structure with ethnocomputing teaching materials and those taught with lecture method?

Table I: mean achievement scores of students taught data structure with ethno computing teaching materials and those taught with lecture method **as** measured by EAT.

Group	**“**	**Pre-test**		**Post=test**		**Mean**
		Mean	**SD**	**Mean**	**SD**	**gain**
Experimental	160	12.05	7.15	22.21	5.91	10.16
Control	157	9.45	5.23	16,37	5.23	6.92
Total	**317**					
Mean Difference			2.6		5.84	3.24

Table I shot.ws that the mean scores of students taught Computer science using the experimental method were 12.05 and 22.21 respectively in the pretest and post-test, with standard deviation of 7.15 and 591 respectively. On the other hand, he control group had the mean scores of 9.45 and 16.37 and standard deviation of 5.63 and 5.23 respectively in the pretest and post-test.

Table I also reveals that the ethncomputing teaching method group got a gain score of 10.16, while the conventional method group had a gain score of 6.92. The ethnocomputing teaching method group differed with the

lecture method group in the mean computer science Achievement gain score by 3.24. This indicates that students taught with ethncomputing teaching method achieved higher than students taught with lecture method. However, the standard deviation scores of the students in the Post test for the ethnocomputing teaching method. However, the standard deviation scores of the students in the Post test for the ethnocomputing teaching method group was 5.91 while for the lecture group it was 5.23, indicating that the students individual scores were more clustered around the mean with lecture method than with the ethnocomputing teaching method.

Research Question 2
What are the mean achievement scores of male and female students taught data structure using ethnocomputing?

Table 2: The Mean achievement scores of male and female SSI students taught data structure using ethnocomputing materials.

Group	**N**	**Pre-test**		**Post=test**	
		Mean	**SD**	**Mean**	**SD**
Experimental					
Male	80	12.05	11.73	22.93	5.10
Female	80	11.50	09.85	21.49	6.57

Table 2 shows the difference in mean scores of male and female students. In the post ethnocomputing achievement test, the male students' achievements score was 22.93 while that of the female counter part was 21.49. This shows that the male students slightly achieved higher than the female students in the post test. Similarly, the standard deviations for the male and female students are 5.10 and 6.57 respectively, indicating that the individual scores of the male students are more clustered around the mean than those of their female counterparts that had more extreme scores.

Research Questions 3
What is the interactive effect of teaching method and gender on students' achievement in computer?

Table 3: The mean achievement scores of SSI students showing the interaction between teaching method and gender as measured by EAT.

GROUP	STATISTICS	MALE	FEMALE	OVERALL
Treatment	Mean	22.93	21.49	22.21
	SD	5.10	6.57	5.91
	n	80	80	160

Control	Mean SD n	17.18 4.51 77	16.56 5.75 80	17.36 5.23 157
53Overall	Mean SD n	20.11 3.60 157	19.53 6.84 157	19.92 6.30 317

Table 3 reveals the mean achievement scores of male and female students in the treatment group as 22.93 and 21.49 with standard deviation of 5.10 and 6.57 respectively. For the control group the mean scores were 17.18 and 16.56 for the male and female students with standard deviations of 4.51 and 5.75 respectively. This shows that both the male and female students of the treatment group achieved better than their counterparts in the control group. But within the treatment group, the male students achieved slightly higher than their female counterparts. The standard deviations show that there are extreme scores with more in the female group of both treatment and control groups. The table also revealed that the overall achievement scores of male and female students in both treatment and control groups were 20.11 and 19.53 with standard deviations of 5.60 and 6.84 respectively. The standard deviation shows extreme scores, with more extreme scores in the female groups than in male group.

Hypotheses

Hypotheses one and two were tested at 0.05 level of significance using analysis of covariance (ANCOVA) the results are shown in Table 4.

Table 4: Result of the ANCOVA: Tests of Between-subjects Effects

Source of Variation	Type of sum Square	df	Mean Square	F-cal	Sig	Dec.
Corrected Model	6294.81	4	372.26	27.99	0.00	S
Intercept	1739.56	1	1737.56	85.00	0.00	S
Pretest(covariate)	466.57	1	466.57	22.82	0.00	S
Method	86.98	1	86.98	4.26	0.04	S
Gender	42.16	1	42.16	2.06	0.15	NS
Method X Gender	22.86	305	22.88	1.12	0.29	NS
Error	6234.89	317	20.44			
Total	130721.00					

a. R Square – 400 (Adjusted R Squared = 380)

S = significant at P 0.05, NS = Not significant at P 0.05

HO_1 : There is no significant difference in the mean achievement scores of students taught computer science using ethnocomputing method and those taught using lecture method.
Table 4 shows that the calculated F-value for the effect of treatment (method) on students' achievement in EAT is 4.26 at 0.04 level of significance, which is less than 0.05 set for the study. And as such, the null hypothesis is rejected.

$Ho_{2:}$:: There is no significant difference in the mean achievement scores of male and female SSI students taught data structure using ethnocomputing materials.

Table 4 shows that the calculated F-value for the effect of gender no student's achievement in the Unit of life taught is 2.06 significant at 0.15 level of significance which is greater than 0.05 level set for the student. The null hypothesis is not rejected. This means that there is no significant difference in the mean achievement scores of male and female students in Post Ethno-computing Achievement Test.

HO^3: There is no significant difference in the interaction effect of method and gender as measured by EAT.

Table 4 shows that the calculated F-value for the effect of the interaction between gender and treatment on students' achievement in the posttest is 1.12 at 0.29 level of significance. This is greater than 0.05 level set for the study. The null hypothesis is therefore accepted.

Findings
Based on the analysis of data as presented in this study, the following major findings were made:

1. Students taught with ethnocomputing teaching method achieved higher than students taught with lecture method
2. There was no significant difference between the mean achievement scores of male and female students in the experimental post-test.
3. There is no significant interaction between method and gender as measured by Ethnocomputing Achievement Test.

Discussions of findings
Table 1 revealed that Student taught with ethncomputing teaching method achieved higher than the students taught using lecture instructional method. The finding has confirmed the relative effectiveness of the use of Ethnocomputing method over lecture method. This made students in the group to record significant higher achievement scores compared to their counterparts in lecture method. The finding is in agreement with Unodiaku, (2013), who found that ethno-based learning approach was effective in enhancing students' academic achievement. This finding also confirms NCTM (2013) view that ethno-based learning aim is to draw from the cultural experience and practices of the

individual learners, the communities, and the society at large, in using them as vehicles to not only make computer science learning more meaningful, but more importantly, to provide learners with the insights of computer knowledge as embedded in their social and cultural environment.

The data analysis in Table 2 has shown that there is no significant difference in the means achievement scores of male and female students taught ethno-computing using demonstration. This finding is in agreement with the finding of Eze (1995), Hoputaife (2001), Eze (2001) and Ndukwue (2000) who found no significant difference in the achievement of the male and female students. This is in disparity with the findings of Ibe and Nwosu (2003). Asoegwu (2008), Atsua and Abdullahi (2015), who observed, in the science and other science related courses

The finding in table 3 has shown that there is no significant interaction effect of treatment and gender on students' mean scores in the post ethnocomputing achievement test. The finding of this study is in agreement with Hoputaife (2011) who found no interaction effect between gender and instructional model. However, this finding disagrees with Eze (2012) Who found an interaction effect exists between male and female students in science achievement. The achievement. The achievement of male and female students may not vary due to variation in the instructional method, especially with the ethnocomputing method.

Conclusions

The results of this study have clearly indicated that the use of ethnocomputing teaching approach enhances students' achievement in computer science. Thus, the use of native groundnut pyramid to teach the concepts of data structure enhances students' performance in computer science. The results of the study also suggest that students in the computer science classes are composed of different sexes with varied ability levels and as such strategies that will encourage and enhance maximum achievement by in such classes be adopted. To this end ethnocomputing teaching method can be included as one of the major teaching approaches to data structure in secondary school's computer science classroom.

Recommendations

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

1. Emphasis on the use if Ethnocomputing teaching materials should be made in the National computer science curriculum for Secondary Schools, as technique to be used in teaching of data structure.
2. Teacher training institutions of learning should include the use of ethncomputing teaching materials as method in the computer science method course content.

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