

EFFECT OF CONCEPT MAPPING INSTRUCTIONAL STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT AND INTEREST IN ECONOMICS IN IMO STATE

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Abstract

This study examined the effect of concept mapping instructional strategy on students' academic achievement and interest in Economics in Imo State. The study adopted the quasi-experimental pre-test, post-test non-equivalent control group design. The population of the study comprised of all the 2,892 senior secondary two (SS II) students who offer Economics in 10 public secondary schools located within Owerri Municipal Council of Imo State. The Purposive sampling technique was used to select the two co-educational schools for the study. The sample for the study consisted of 48 Economics students from two intact classes. The instruments for data collection were "Economics Interest Scale (EIS)" and "Economics Achievement Test (EAT)". The instruments were pilot tested on 30 students from a non-participating school. The EIS yielded a Cronbach alpha reliability index of .84 which was a good reliability index while EAT has an index of .78 using Kuder Richardson formular 21. The research questions were answered using mean and standard deviation while the hypotheses were tested at .05 level of significance using One-Way Analysis of Covariance (ANCOVA). It was found among others that concept mapping teaching strategy is more effective than the lecture method in teaching of Economics. This implies that concept mapping was effective in the improvement of students' achievement and interest in Economics. Based on the findings in this study, it was recommended that: in order to enhance students' performance in Economics, concept-mapping should be adopted as a teaching strategy by Economics teachers, who are the central factor at the Economics curriculum implementation level, also the is need for seminars and workshops should be organised to improve Economics teachers pedagogical skills and to broaden their knowledge of instructional methods in order to constantly update their knowledge of innovations in teaching.

Keywords: Concept mapping, students' achievement and interest in Economics

One of the aims of secondary education is to equip students to live practically in this modern age of science and technology (Federal Republic of Nigeria, 2013). To this end, students at the senior secondary level of education are required and expected to study one social science subject like Economics as a prerequisite to the study of courses such as Accounting, Economics, Business Management, et cetera. This gives Economics a unique position indeed.

Economics is a social science that studies human behaviours in its effort to allocate his scarce resources efficiently and effectively in order to minimize cost (Amaechi, 2014). It is one of the subjects that is offered in the senior secondary schools in Nigeria. According to Hansen in Oleabhiele (2014), Economics is one of the few social science subjects that heavily utilize statistical and mathematical models to analyze real-life economic problems. The relevance of Economics as a requirement for technological advancement of a nation cannot be underrated. Economics as a subject,

helps to develop in the learner skills such as analysis, experimentations, manipulation of variables and making decisions which are very important in social economic investigations.

However, the West Africa Examination Council (WAEC) Chief Examiner's Report (2017) show evidence of poor Economics achievement. For instance, in 2017, only 177, 800 candidates representing 15% of the 1, 184,384, that sat for the examination obtained credits in five subjects including, Economics. However, the performance of students in Economics in the senior secondary school certificate Examinations (WASSC, NECO and GCE) have not been encouraging, probably due to ineffective teaching and learning of the subject.

According to Oleabhiele and Ikwumelu (2012), obstacles to effective teaching and learning of Economics at the secondary school level include; negative attitudes of teachers and students, lack of relevant instructional materials, the nature of the curriculum, the presence of too many topics to be taught and the inadequate periods allotted, among others. In a bid to cover syllabus, teachers resort to the use of traditional method of teaching such as the lecture method which involves mostly the cognitive domain of learning to the detriment of the affective and psychomotor domains. Similarly, Adamu (2010) advanced reasons for the poor performance of students in economics among which are inadequate teaching methods used by teachers, general students' attitudes to learning.

It is against this backdrop of students' poor performance which could be a resultant effect of poor presentation of strategies (coupled with other factors), that conscious efforts are being continuously made to determine suitable strategies that will facilitate effective learning and understanding of Economics concepts at the senior secondary school level. This conscious efforts prompt the researcher to undertake the study which is to ascertain the effect of concept mapping instructional strategy on students' academic achievement and interest in Economics in Imo State

A concept map is a schematic device for representing the relationships among a set of concepts. A concept is a perceived regularity in events or objects, or records of events or objects, designated by a label. Concept mapping is a technique for externalizing one's understanding of a conceptual framework (Brinkerhoff & Booth, 2013). It is not focused on individual concepts, but on the organization of a set of concepts in a conceptual framework; it emphasizes organization of the whole. In its simplest form, concept mapping is a representation of knowledge organized into cognitive structures.

Furthermore, concept mapping is one of such activity-based instructional strategies. It helps students to learn meaningfully, thus assisting them to overcome the problem of misconception (Novak & Canàs, 2008; and Novak & Gowin, 2010). The strategy utilizes concept-mapping which is a graphical representation of the relationship among terms. Supporting this assertion, Yusuf (2009) affirmed that concept mapping helps learners to think more effectively as a group without losing their individuality. Concept mapping shows the interconnections among networks of related concepts and it is a powerful but simple way of using diagrams to display information in the same way one thinks (Meijers, 2012). Concept mapping differs from other knowledge representations in that it utilizes ideas from constructivist epistemology and Ausubel's assimilation theory of cognitive learning and that it places high value on prior knowledge in the process of acquiring new knowledge. Thus, concept mapping may be operationalized to mean a teaching tool that shows relationships between concepts through the use of graphic presentation. The pedagogical value of concept mapping lies in its use to establish relationship in concepts/topics to enhance retention which, in turn, improves achievement in learning.

The understanding of the learner and the interest which this understanding builds provide a structure into which the new concept to be learnt can be integrated into the learned concepts that the learner already possessed. That was why Novak and Godwin (2010) stated that concept mapping has become an important tool to help students learn to learn meaningfully and to help teachers become more effective teachers. Mapping is showing a map, or makes a map.

In the same vein, concept mapping according to Novak, has various uses; it is used as a advance organizer and it can be used as a powerful evaluation tool. The students construct maps to show the summary of what they have been taught. The teacher goes through their maps and then determines whether the student has learnt what he /she taught them. The students can also use their maps to evaluate their understanding to what they have been taught. It can be used to show prior knowledge about a given topic. The teacher at the end of the lesson, can construct a concept map or display an already constructed map to summarize a lesson.

Teachers' methods of teaching particularly those relating to the conventional methods have been found to be inadequate for an economic value-laden subject like Economics. This therefore calls for a change in pedagogy. Concept mapping which is an active learning and participatory method that would encourage critical thinking, enable decision making and learners taking responsibility for their learning has been advocated.

Empirically, Alebiosu and Michael (2011), AbdulSalam (2009), Olorundare and Aderogba (2009) in their respective study, found out that students that were exposed to concept-mapping perform better than those that were exposed to the traditional or conventional method. The effectiveness of concept-mapping could be attributed to its nature. As an instructional method, concept-mapping promotes meaningful learning. And the pedagogical value of concept mapping lies in its use to establish relationship in concepts /topics to enhance retention, which in turn improve achievement in students' learning (Jibrin & Zayum, 2012). This is contrary to conventional method which promotes rote learning. Although a student that employs rote learning will also retain information for a long time, he will have little or no integration of new knowledge and tends to quickly forget what he learns (Novak & Godwin, 2010).

Similarly, Wushishi (2013), Wushishi, Danjuma and Usman (2013) reiterated that interest is significantly correlated with teaching methods to enhance students' achievement in subjects. Interest is the feeling that accompanies special attention to an object or activity, it is a motivational component characterizes by increased attention and concentration. It can be seen that the above studies were not comprehensive enough and also failed to use Economics as a subject. This necessitated the present study with the main objective to investigate the effect of concept mapping in the teaching of economics since none study to the knowledge of the researcher had been carried out to ascertain the effect of concept mapping in the teaching of Economics. This is the crux of this study which is on the effect of concept mapping instructional strategy on students' academic achievement and interest in Economics in Imo State.

Purpose of the Study

The main purpose of this study is to examine the effect of concept mapping instructional strategy on students' academic achievement and interest in Economics in Imo State. Specifically, the study sought to;

- 1) ascertain the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test, and

2) determine the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Research Questions

The following research questions were posed to guide the study:

1. What are the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test?
2. What are the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test?

Hypotheses

The following null hypotheses were formulated and tested at .05 level of significance.

HO₁: There is no significant difference between the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

HO₂: There is no significant difference between the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Methodology

The study adopted the quasi-experimental pre-test, post-test non-equivalent control group design. The study was conducted in Imo State, Nigeria. The target population of the study was all SSII students in senior secondary schools in Owerri Municipal of Imo State offering Economics. The reason to use of SSII students was because at this level, the students already exposed to the core concepts in economics and are not facing the problem of being freshly introduced to senior secondary Economics content (as is the case of SS1 students) nor preparing for any external or terminal examination (as is the case of SSIII students).

The population of the study comprised of all the 2,892 senior secondary two (SS II) students who offer Economics in 10 public secondary schools located within Owerri Municipal Council of Imo State. The sample for the study consisted of 48 Economics students drawn from two co-educational senior secondary schools in Imo State. Purposive sampling technique was used to select the two co-educational schools for the study. One intact class was chosen randomly from each of the schools. The schools were then assigned randomly to one experimental and one control group. The experimental group was taught using the concept mapping instructional strategy while the control group was exposed to the lecture method.

The instruments for data collection using “Economics Interest Scale (EIS)” and “Economics Achievement Test (EAT)”. The EIS is a rating scale with 40 items in four response options which was used to get information on the interest of the students in Economics. While the EAT was a 40-item multiple-choice objective test with four options: A-D. The instrument was validated by three experts one from Economics Education, one from Economics and one from measurement and Evaluation all from Michael Okpara University of Agriculture, Umudike using test blue print. The instruments were pilot tested on 30 students from a non-participating school. The EIS yielded a reliability index of .84 using cronbach alpha while EAT has a reliability index of .78 using Kuder Richardson formula 21. This proves that the instruments were reliable for the study.

The pre-test was administered to both the experimental and control groups before the treatment. The treatment was done strictly on selected topics drawn from senior secondary school II syllabus. The experimental groups were subjected to treatment of concept mapping instructional strategy method, while the control group was taught using the lecture method. Therregular classroom teachers of the sampled schools were trained with an instructional manual and used for the teaching exercise. The post-test was administered to both the experimental and control groups after six weeks of instruction.

The research questions were answered using mean and standard deviation while the hypotheses were tested at .05 level of significance using One-Way Analysis of Covariance (ANCOVA).

Results

Research Question One

What are the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test?

Table 1: Mean Achievement Scores of Students Taught Economics with Concept Mapping Instructional Strategy and those Taught with Lecture Method at pre-test and post-test

Group	Pre-test			Post-test	
	N	\bar{X}	SD	\bar{X}	SD
Concept Mapping	24	24.71	2.48	33.92	2.70
Lecture Method	24	23.71	2.69	22.92	2.34

Table 1: shows the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught using lecture method at pre-test and post-test. The table shows that students under the concept mapping instructing strategy had a pretest mean score of 24.71 with a standard deviation of 2.48 while at post test their score increased to 33.92 with a standard deviation of 2.70 indicating a mean gain of 9.21. Also students under the lecture method had a pre test mean score of 23.71 and a standard deviation of 2.69 but their scores at post test was still minimal at 22.92 with a standard deviation of 2.34 indicating a mean loss of 0.79. The conclusion is that concept mapping teaching method is more effective than the lecture method in teaching of Economics. This implies that concept mapping was effective in the improvement of students' achievement in Economics.

Research Question Two

What are the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test?

Table 2: Mean Interest Scores of Students Taught Economics with Concept Mapping Instructional Strategy and those Taught with Lecture Method at pre-test and post-test

Group	Pre-test			Post-test	
	N	\bar{X}	SD	\bar{X}	SD
Concept Mapping	24	89.59	4.18	144.32	4.08

Lecture Method	24	89.79	4.54	90.02	4.37
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Table 2: shows the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test. The table shows that students under the concept mapping teaching method had a pre test mean interest score of 89.59 with a standard deviation of 4.18 while at post test, their interest mean score increased to 144.92 with a standard deviation of 4.08. Also students under the lecture method had a pre test interest mean score of 89.79 and a standard deviation of 4.54 but their scores at post test was still minimal at 90.02 with a standard deviation of 4.37. The conclusion is that concept mapping teaching method is effective in steering up the students' interest to study Economics than the lecture method.

Hypothesis One

HO₁: There is no significant difference between the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Table 3: Analysis of Covariance (ANCOVA) for the Significant Difference between the Mean Achievement Scores of Students Taught Economics with Concept Mapping Instructional Strategy and those Taught with Lecture Method at pre-test and post-test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1506.744 ^a	2	753.372	141.894	.000
Intercept	172.329	1	172.329	32.457	.000
PRETEST	54.744	1	54.744	10.311	.002
TEACHINGMETHOD	1292.449	1	1292.449	243.427	.000
Error	238.922	45	5.309		
Total	40506.000	48			
Corrected Total	1745.667	47			

a. R Squared = .863 (Adjusted R Squared = .857)

Table 3 above displayed the result gotten in respect of hypothesis 1. From table 3, the fourth row revealed that the F-calculated value for posttest effect as 243.427 with significance probability of 0.000 which is less than 0.05. This indicates that the posttest effect is significant at 5% level of significance (P<0.05). This showed a significant difference between the two teaching methods with regards to achievement. The researcher therefore rejected the null hypothesis and accepted the alternative hypothesis that is to say that there is a significant difference between the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Hypothesis Two

HO₂: There is no significant difference between the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Table 4: Analysis of Covariance (ANCOVA) for the Significant Difference between the Mean Interest Scores of Students Taught Economics with Concept Mapping Instructional Strategy and those Taught with Lecture Method at pre-test and post-test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1506.744 ^a	2	89.293	7.870	.001
Intercept	172.329	1	683.862	60.272	.000
PRETEST	54.744	1	34.187	3.013	.091
TEACHINGMETHOD	1292.449	1	149.607	13.186	.001
Error	238.922	45	11.346		
Total	40506.000	48			
Corrected Total	1745.667	47			

a. R Squared = .306 (Adjusted R Squared = .226)

Table 4 above displayed the result gotten in respect of hypothesis 2. From table 3, the fourth row revealed that the F-calculated value for posttest effect as 13.186 with significance probability of 0.001 which is less than 0.05. This indicates that the posttest effect is significant at 5% level of significance ($P < 0.05$). This showed a significant difference between the two teaching methods with regards to interest. The researcher therefore rejected the null hypothesis and accepted the alternative hypothesis that is to say that there is a significant difference between the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test.

Discussion of the Findings

The result showed that concept mapping instructional strategy is more effective than the lecture method in teaching of Economics. This implies that concept mapping was effective in the improvement of students' achievement in Economics. The study also inferred that there is a significant difference between the mean achievement scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-test and post-test. The finding agrees with the findings of previous researchers like Alebiosu and Michael (2011), AbdulSalam (2009), Olorundare and Aderogba (2009) who found out in their respective studies that students that were exposed to concept-mapping perform better than those that were exposed to the traditional or conventional method. The effectiveness of concept-mapping could be attributed to its nature. As an instructional strategy, concept-mapping promotes meaningful learning. By this, according to Jibrin and Zayum (2012) the utilisation of concept mapping enhances students' achievement and as well stimulate their interests and improve knowledge retention. This is contrary to lecture method which promotes rote learning. Although a student whose teacher encourages rote learning will also retain information for a long time, he will have little or no integration of new knowledge and tends to quickly forget what he learns (Novak & Godwin, 2010).

It was also revealed in this study that concept mapping instructional strategy is effective in steering up the students' interest to study Economics than the lecture method. This led to the inference that revealed that there is a significant difference between the mean interest scores of students taught Economics with concept mapping instructional strategy and those taught with lecture method at pre-

test and post-test. These findings are consistent with Wushishi (2013), Wushishi, Danjuma and Usman (2013) asserted that interest is significantly correlated with teaching methods to enhance students' achievement in subjects. Interest is the feeling that accompanies special attention to an object or activity, it is a motivational component characterized by increased attention and concentration.

Conclusion

This study concluded that the Concept-Mapping instructional strategy positively improved students' understanding of Economics and invariably, their performance and interest. Therefore, the need for Economics teachers to apply concept mapping in the teaching of economics at all levels of education

Recommendations

Based on the findings in this study, it was recommended that:

- i. In order to enhance students' performance in Economics, concept-mapping instructional strategy should be adopted in the teaching and learning of Economics at all educational level.
- ii. Economics teachers, who are the central factor in Economics curriculum implementation level, should endeavour to improve on their pedagogical skills, broaden their knowledge of instructional methods, and constantly update their knowledge of innovations in teaching.
- iii. There is need for constant organization of seminars and workshops for the Economics teachers on how concept-mapping instructional strategy can be applied to the teaching of Economics.
- iv. Curriculum and Educational Planners should incorporate innovative teaching methods with respect to Economics.

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