

## **EFFECT OF CONCEPT-MAPPING TECHNIQUE ON STUDENTS' ACADEMIC PERFORMANCE IN SOCIAL STUDIES IN RIVERS STATE, NIGERIA**

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### **ABSTRACT**

The study examined effect of concept-mapping technique on students' academic performance in social studies in Rivers State. Three objectives, three research question and three hypotheses were formulated to guide the study. A quasi-experimental pre-test -post-test control group design was adopted. Population of the study consists of 3000 junior secondary students in Rivers State. The sample size consisted of 181 junior secondary school II students drawn from intact classes through purposive sampling technique. Social Studies academic performance test (SOSAPT) was used for data collection, reliability coefficient was determined using Kuder Richardson method and it yielded an index of 0.80. Face and content validity were determined by two experts. Mean and standard deviation were used to answer the research questions, while t-test and analysis of covariance (ANCOVA) was used in testing the hypotheses at 0.05 level of significance. The finding reveals that there was a significant difference between the mean performance scores of students taught social studies using concept-mapping technique. Male students performed better than the female students taught concept-mapping technique. Students taught Concept-mapping technique performed better than those taught using lecture method. The researcher therefore recommended that amongst others the use of concept-mapping technique should be adopted so as to compliment the traditional methods of teaching.

### **INTRODUCTION**

The importance of Social Studies as a subject on the Nigerian school curriculum cannot be overemphasized. Dania (2004) states that the focus of Social Studies is to extricate the Nigerian child from the apron strings of colonial education which merely propagated foreign values and therefore acquaint him with his own cultural value and traditions. The teaching of Social Studies is directed towards building a virile Nigerian Nation, irrespective of its ethnic diversity. It is also directed towards promoting citizenship and values education in addition to skills development. Several efforts have been put in place by stakeholders in the education sector to promote the effective teaching of Social Studies in secondary schools. However, it was observed that students continue to record poor performance in both internal and external examinations.

Considering the importance of Social Studies education to secondary school students and in nation building at large this on-going trend if left unchecked may spell doom for the future of Social Studies in Rivers State and the survival of the Nigerian nation at large. The reasons for poor performance in Social Studies as identified in the study area could be as a result of poor choice of instructional strategies, abstract nature of teaching Social Studies concepts, lack of

qualified teachers, poor infrastructural facilities, overcrowded classroom and non-availability and utilization of instructional materials. On the other hand, students have often complained particularly about the way in which the subject is being taught by Social Studies teachers. From the little interaction that the researchers had with students in the study area, also heard students complain of the methods used in teaching them. The methods used by teachers according to these students were not capable of arousing and sustaining their interest in the subject which often reflect in their performances in external examinations (Basic Certificate Examination). However, these are complaints that the students cannot substantiate. It may or may not be true.

Also, several educational scholars revealed that most Social Studies teachers still rely mostly on the lecture method of imparting knowledge. The experts further stated that while the manner of presentation is supposed to be activity-based, most Nigerian secondary school teachers still rely on the lecture method. This teaching method is mostly theoretical and teacher-directed, instead of being constructive or student-centered. Hence, there was the need to focus on one of the teacher-related method that will promote effective teaching and learning of the subject. This is so because, the teacher is found at the pinnacle of any curriculum implementation process, because, the instructional strategy he/she adopts can promote or distort the learning outcomes of students. The choice of instructional strategy by Social Studies teachers in the State may or may not be the only striking reason attributed to the poor performance of students in Social Studies examinations. However, there is the need to adopt a newer and effective instructional strategy that could help remediate the learning difficulties experienced by secondary school students in Social Studies.

The use of concept maps as a teaching strategy was first developed by J.D. Novak of Cornell University in the early 1980s as cited by Cheema and Mirza (2013). It was derived from Ausubel's learning theory which places central emphasis on the influence of students' prior knowledge on subsequent meaningful learning. The concept map is a diagrammatic device used to represent the conceptual structure of a subject discipline in a two-dimensional form which is analogous to a road map. Novak in Cheema and Mirza (2013) further explain that concept maps are also visual diagrams constructed to represent the organization of concepts/ideas and outline the relationship among or between those concepts. Again, concept maps were seen by Novak and Canas (2006) as the representations of organized knowledge in diagrams which can be done in hierarchical and/or linear order with the most inclusive concept on top of the map and the most specific concept at the bottom.

From the above explanation, concept-mapping can be used to deal with linking of a particular concept during studies. It can be likened to a spider chart, and likened to an organized chart or a flow diagram. Concept maps, simply put, are diagrammatic propositions and propositions are two or more concept labels linked by words which provide information on relationships or describe connections between concepts. Concepts do not exist in isolation; each concept depends on its relationship to many others for meaning. Concept-mapping instructional strategies is one of the student-centered strategies that have been shown to improve students' achievement in previous studies, based on the available literature.

Besides, the process development in concept-mapping technique allows the students to use the concept-map to illustrate how a series of events could lead to desirable results, while the persuasive argument concept-mapping technique enables students link the various concepts with the intention of convincing or influencing people's opinions or beliefs or feelings towards expected end. Research topic concept-mapping technique is such that presents a

problem and investigates into the cause of the problem, provides solutions and recommendations that would be generalized to the entire population. The narrative story links concept-mapping technique which focuses on the account of an event or occurrences in a story to buttress teaching objectives in a particular subject.

From the available literature survey conducted, there seems to be few studies on the use of concept map techniques to test its effect on students' academic performance in Social Studies in junior secondary school level. Therefore, it would be worthwhile to carry out this research to determine the effect of concept-mapping techniques on students' academic performance in Social Studies in secondary schools in Rivers State.

### **Statement of the Problem**

Several studies seemed to support the general view about the poor performance of students in examinations as orchestrated by poor teaching strategies adopted by classroom teachers. The results collated from 30 junior secondary schools randomly sampled from the 23 Local Government Areas in Rivers State (2010 to 2018 academic years), showed that students still performed below average in both internal and external examinations in Social Studies.

Also, it has been observed that teachers find it difficult to teach some Social Studies concepts, due to the use of didactic or poor methodological approaches. The situation calls for a search for an alternative teaching technique that will guarantee effective and meaningful learning of Social Studies. It is against this background that this study is conducted by the researchers to ascertain the effect of concept-mapping techniques on students' academic performance in Social Studies in secondary schools Rivers State. The problem statement of the study therefore is: what is the effect of concept-mapping techniques on students' academic performance in Social Studies in secondary schools in Rivers State?

### **Aim and Objectives of the Study**

This study aims to examine the effect of concept-mapping techniques on students' academic performance in Social Studies in secondary schools in Rivers State. Specifically, the objectives of the study are to:

1. determine the difference in the mean performance scores of students in Social Studies before and after being taught with concept-mapping technique.
2. examine the difference in the mean academic performance of male and female students in Social Studies taught with concept-mapping technique.
3. examine the difference in the mean academic performance score of students taught Social Studies using concept-mapping technique and those taught using lecture method.

### **Research Questions**

The following research questions guided the study:

1. What is the difference in the mean performance scores of students in Social Studies before and after being taught with concept-mapping technique?
2. What is the difference between the mean academic performance scores of male and female students in Social Studies when taught with concept-mapping technique?
3. What is the difference between the mean academic performance of students taught Social Studies using concept-mapping technique and those taught using lecture method?

## Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference between the mean performance scores of students in Social Studies before and after being taught with concept-mapping technique
2. There is no significant difference between the mean academic performance scores of male and female students in Social Studies when taught with concept-mapping technique
3. There is no significant difference between the mean academic performance scores of students taught Social Studies with concept-mapping technique and that of those taught using lecture method

## Methodology

This study adopted a pretest-posttest group quasi experimental design. According to Nwankwo (2013) quasi experimental design is a study in which some threat to validity cannot be properly controlled because of unavoidable situation associated with the study when human beings are used for experimental study. The population of the study comprised all public junior secondary school three (JSS 3) students in Eleme Local Government Area of Rivers State. As at the time of study there were 1150 year 3 students in the public junior secondary school in this area (2019/2020 academic session). The sample size for the study was 181 junior secondary school three (JSS 3) students drawn with the use of simple random sampling techniques, 84 male and 97 females were involved in the study. They were placed into experimental and control groups respectively.

The instrument used for data collection was a questionnaire titled 'Social Studies' Academic Performance Test' (SSAPT) developed by the researchers. The instrument was subjected to face and content validity by two experts. The reliability of the instrument was tested using 20 respondents outside the sample size but equivalent in all respect using test-retest method, Cronbach's Alpha reliability method was used and a reliability coefficient of 0.80 was obtained. This was considered adequate for the study. The researchers used two qualified social studies teachers as assistants in administering the questionnaires to the respondents. Mean rating, standard deviation were used in analysing the research questions while t-test was used in analysing the three hypotheses at 0.05 level of significance.

## Results

The sequence of the presentation of the result obtained in this study is in accordance with the research questions and hypotheses raised to guide the study.

**Research Question One:** What is the difference between the mean performance scores of students in social studies before and after being taught with concept-mapping technique?

**Table 1: Mean analysis of difference in performance of student before and after being exposed to concept-mapping technique**

Variables	n	$\bar{x}$	SD	Mean Diff
Pre-test	37	42	8.81	30
Post-test	37	72	10.01	

Table 1 above shows the mean of the pre-test and post-test scores as 42 and 72 respectively. The difference between the mean is 30 in favour of the post-test (i.e. when CMT was introduced)

**Research Question Two:** What is the difference between the mean academic performance of male and female students in social studies when taught with concept-mapping techniques.

**Table 2: Mean analysis of difference in performance of students exposed to Concept Mapping Technique (CMT) based on gender**

Gender	N	Pre-test	SD	Post-test	SD	Mean-diff Post-test
Male	37	42.03	9.47	72.8	10.88	1.7
Female	53	41.9	8.35	71.1	9.23	

Table 2 above shows the post- test mean score of male and female students as 72.8 and 71.1 respectively. This shows a mean difference of 1.7. Hence, there is a difference in the mean performance score of the students based on gender.

**Research Question Three:** What is the difference between the mean academic scores of students taught social studies with concept-mapping technique and that of those taught with lecture method?

**Table 3: Mean analysis of differences in performance of experimental and control group**

Group	N	Pre-test $\bar{x}$	SD	Post-test $\bar{x}$	SD	Post-test mean diff
Experiment	90	42.50	8.81	71.83	10.04	14.47
Control	91	32.03	8.50	57.36	13.17	

Table 3 above shows the post-test mean scores of experimental and control groups as 71.83 and 57.36 respectively. The difference between the post-scores mean is 14.47.

**Hypothesis One:** There is no significant difference in the mean performance scores of students in social studies before and after being taught with concept-mapping technique.

**Table 4: Paired-t-test analysis of the difference in the pre-test and post-test mean scores of students is exposed to CMT.**

Variable	n	S <sup>2</sup>	d	df	t-cal.	t-crit.	decision
Pre-test	90	10.38	7.51	89	6.78	1.96	significant
Post-test	90						

Table 4 above the sample variance (S<sup>2</sup>) and mean deviation (d) of the scores as 10.38 and 7.51. the calculated t-value (6.78) is greater than the critical value (1.96) at 0.05 level significance and 89 degree of freedom. Hence, the decision is that there is a significant difference in the post-test and pre-test mean scores of students in social studies exposed to concept-mapping technique in favour of post-test scores.

**Hypothesis Two:** There is no significant difference in the mean academic performance of male and female student in social studies when taught with concept-mapping technique

**Table 5.: t –test analysis of difference in the mean scores of students exposed to CMT based on gender.**

Gender	n	SD	df	t-cal.	t-crit.	Decision
Male	37	10.88	88	0.773	1.96	Not significant
Female	53	9.23				

Table 5 above shows that the calculated t-value as 0.773 and the critical value as 1.96. since the t-calculated is less than the t-critical at 0.05 level of significance and degree of freedom of 88, the null hypothesis is retained. The decision is that there is no significant difference

between the mean performance of male and female students in social studies when taught with concept-mapping technique.

**Hypothesis Three:** There is no significant difference between the mean academic performance of students taught social studies with concept-mapping technique and that of those taught with lecture method. Analysis of covariance was employed in testing the null hypothesis.

**Table 6: Summary of ANCOVA on difference between the mean academic performance of students taught social studies with concept-mapping technique and that of those taught with lecture method.**

Source of Variance	Sum of squares	df	Mean square	F	P value	Partial Eta Squared
Corrected Model	9587.075 <sup>a</sup>	2	4793.537	34.858	.000	.281
Intercept	34329.301	1	34329.301	249.641	.000	.584
PRETEST	111.967	1	111.967	.814	.368	.005
GROUP	6033.746	1	6033.746	43.877	.000	.198
Error	24477.566	178	137.514			
Total	788425.000	181				
Corrected Total	34064.641	180				

a. R Squared = .281 (Adjusted R Squared = .273)

Table 6 showed that the calculated F-value for group is 43.877 at degrees of freedom of 1 and 178 at  $p < 0.05$ . The calculated F-value was significant at  $p < 0.05$  which is less than 0.05 level of probability ( $F = 43.877$ ,  $df = 1/178$ ,  $p < 0.05$ ). Hypothesis four was therefore rejected. This showed that there is a significant difference between the mean academic performance of students taught social studies with concept-mapping technique and that of those taught with lecture method. The result also reveals that concept-mapping technique affect students' performance at partial eta square of 0.198. This indicates a moderate effect size.

**Table 4.9: Post hoc analysis of the difference between the mean academic performance of students taught social studies with concept-mapping technique and that of those taught with lecture method.**

#### Pairwise Comparisons

Dependent Variable: POSTTEST

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence Interval for Difference <sup>b</sup>	
					Lower Bound	Upper Bound
TREATMENT	CONTROL	13.514*	2.040	.000	9.488	17.540
CONTROL	TREATMENT	-13.514*	2.040	.000	-17.540	-9.488

Based on estimated marginal means

\*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

A critical look at Table 6 indicated that all the group means compared (treatment and control) yielded significant mean differences. The results further indicated that the mean difference



between treatment and control was 13.514. This implies that treatment group contributed most to the significant difference observed and therefore was most effective in enhancing students' performance.

## DISCUSSION

The study investigated the effect of concept mapping techniques on students' academic performance in social studies in Rivers State, Nigeria.

The findings of the study as shown on tables 1, 3 and 4 revealed that there is significance difference in the level of academic performance of social studies students exposed to concept mapping techniques through the pre-test and posttest scores. The calculate t-cal. of 6.78 is greater than the t-crit of 1.96. These findings are in agreement with the work of Ogonnaya, Okafor, Abonyi and Ugama (2016) who investigated the effects of concept-mapping instruction approach on students' achievement in Basic Science in Ebonyi State. Their results showed that concept-mapping fosters students' achievement in basic science than Lecture method.

Also, Tables 2 and 5 on students exposed to concept mapping technique based on gender revealed that there was no significant difference between the male and female academic performance. The calculated table value (t-cal.) is 0.77 is less than t-crit. of 1.96. These finding are in agreement with study of Kuma and Panipat (2014) who examined the effect of teaching through concept-mapping on achievement in Social Studies.

## CONCLUSION

Based on the findings of the study, it is concluded that:

1. Concept-mapping technique enhances the performances of students
2. The use of concept mapping technique did not show any significant difference in the performances of male and female students.

Therefore, concept mapping technique is an effective method that could be used at all levels of education to enhance the students' academic performances in social studies.

## RECOMMENDATIONS

Based on the findings and conclusion of the study, it is recommended as follows:

1. The use of Concept-mapping technique should be used, so as to compliment other traditional methods
2. Social Studies teachers should be encouraged to use concept-mapping technique in teaching-learning process.
3. Curriculum planners and policy makers should include concept mapping technique in the teacher education curriculum.
4. Teachers should be adequately trained in the use of concept-mapping technique, in order to promote teaching and learning of social studies at all times.

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