

Effects of Conceptual Diagrams Technique on Attitude and Achievement of Junior Secondary School Students in Social Studies in Biu, Nigeria

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Abstract

This study investigated the effects of conceptual diagrams technique on attitude and achievement of junior secondary school students in Social Studies in Biu, Nigeria. To drive home the objectives of the study, two research questions with corresponding hypotheses were formulated. This study employed the theory propounded by David Ausubels' in 1962 and was further developed in 1978 titled 'Theory of Meaningful Learning'. And social interdependence theory propounded by Kurt Lewis (1935, 1948) and further developed by Deutsch (1949). The study adopted the quasi-experimental research design. The design was the non-equivalent pretest/posttest control group design which involves two groups, the experimental and control groups. The population of this study consisted of all the 4282 junior secondary school students offering Social Studies from 30 junior secondary schools in Biu, Borno state. The data source is obtained from Borno State Ministry of Education, 2018. The population was made up of 2123 male and 2159 female. The sample of schools was made up of 4 junior secondary schools, to be selected from the 30 junior secondary schools that fall within the study area. The sample size was 216 students to form four intact classes from two urban and two rural junior secondary schools assigned for the experimental and control groups respectively. The sampling technique for this study was the disproportionate stratified and simple random sampling technique because it gave chances of selection and representation of sampled schools. The researcher used two self-designed instruments to collect data for the study. The instruments are; Social Studies Achievement Test (SSAT) and Social Studies Students Attitude Questionnaires (SSAQ) for junior secondary school students. Content and construct validity were established for the instrument and trial-testing of the instruments produced reliability coefficient of .832 and 0.89 respectively, which is reliable. Mean and Standard deviation were used to answer the research questions while ANCOVA was used to test the null hypotheses. It was found that, conceptual diagrams technique was found to be effective in positively changing the attitude of secondary school students in Social Studies as shown in the result that there is a significant difference in the attitude of students in Social Studies in the experimental and control groups. It was concluded that, the use of conceptual diagrams strategy has the potentials of helping to foster cooperation, mutual trust, understanding and more effective communication sharing other peoples' world views and ultimately lead to improved knowledge of students in Social Studies classroom for democratic living in our dear country Nigeria. It was recommended among others that, Teachers' Associations such as Social Studies and Social Studies Association of Nigeria (SOSCEAN) should organize seminars and workshop for teachers in order to make them familiar and interested in the use of the conceptual diagram instructional strategy in the teaching of Social Studies and other related courses.

Keywords: *Achievement, Attitude, Conceptual Diagrams, Social Studies, Technique*

Introduction

Social Studies is the study of various aspects of social sciences that have been integrated or blended into one discipline. It is one of the cores and compulsory subjects in Nigerian junior secondary schools. Social Studies is the foundation for subsequent studies in the different branches of social sciences and humanities, it serves as a general introduction to the social sciences for those who may not, for one reason or the other continue in the social science. Thus, the success or failure of the subject at junior secondary schools has critical implications for the society. A solid foundation in Social Studies will equip the students with the basic skills and knowledge for successful social science careers in the future, thereby contributing to the much-needed socio-economic and national advancement of Nigeria (Egan, Ariya, Oti & Umaru, 2024). On the other hand, poor foundation in Social Studies will have negative consequences on Nigeria quest for development of both the social, political and economic advancement of the nation. It is for these reasons that Social Studies educators' emphasizes effective teaching of the subject at the junior secondary school level.

Since Social Studies is considered to be a relevant subject because of its curriculum content that is developed to prepare students as effective and active citizens, the subject increase students' knowledge, their reflective and critical thinking (Bilesanmi & Awoderu (2024). This call for innovative teaching technique to meet the needs of the students, although there are issues about the importance of the subject in Nigeria educational system. Because subjects like Social Studies, value education and religion studies among others have contents similar to Social Studies. Social Studies curriculum is geared toward producing effective citizens that can be useful to themselves and the society at large therefore students' achievement in the subject should be encouraging at the junior secondary schools' level.

Social Studies is also seen as a global discipline that studies humans in their immediate environment and other parts of the world and the reciprocal interaction with the society. Supporting this assumption, Olugbenga, (2019) observed that the primary objective of teaching Social Studies is to help develop students as global citizens. Accordingly, the national educational objectives stated both the immediate and long-time expectation of behavioural change such as inculcation of national consciousness, global citizenship, and patriotism. Therefore, Social Studies instruction need techniques that can help the learner participate actively in the process of teaching and learning (Ariya, Umaru & Egan, 2017). In constructivists' classroom, learning is the result of individual mental construction in which learner's match new experience against given information to establishing meaningful connections. According to Erinnocho (2013) achievement of students in Social Studies as a social subject in the recent time has not been consistently good and encouraging due to poor attitude to the subject at the basic level and the subject is not included in the senior secondary level of learning in Nigeria schools. The Nigerian government, educational reforms, educators, parents and students themselves are concern about the causes of this poor achievement. Mezieobi (2014) responded to the above scenario by emphasizing the need to use learner – dominated teaching techniques in teaching Social Studies concepts because it make learning interesting to the students when they learn by participating actively in the process. Academic achievement is long been recognized as one of the important goals of education the world over. Students' achievement in Social Studies can also be improved through effective use of modern teaching technique such as conceptual diagrams instructional technique.

Teaching with diagrams helps to prepare students to acquire skills that can help in adapting to new opportunities and appreciate socio-cultural complexities and internal perspective. There is evidence that suggests large learning gains when instruction includes different strategies and techniques (Oti, Egan, Salami & Uzochukwu, 2020). This indicates that teaching techniques alone do not always lead to improvement in learning outcome. Thus, they create ways to expose Social Studies students to more effective way of learning such as the conceptual diagrams instructional technique. But it suggested that more innovation into teaching techniques is needed in Social Studies with the aim of improving students' achievement such as in Conceptual diagram techniques which allow students to ignore rote learning and it can support students' reflective thinking where ideas or concepts are systematically arranged (Arigbabu & Mji 2014). The impact of using this technique on the development of creative thinking of students provides a series of advantages in promoting understanding and concept organization skills.

Learning in the traditional method of instruction is under the control of the teacher. Who tells students what they need to know. While conceptual diagram technique allows learning to be placed in a context under the control of the students. It is against this background that Alvarez (2021) found that students take responsibility when confronted with meaningful learning materials, he further explained if given opportunity students would take charge and be responsible for their own learning during teaching – learning with conceptual diagram. This is not a surprising revelation since students are permitted to ask their own questions, however, it does point out the need to spend more time in teaching using conceptual diagram to students so that they was familiar with its component and use in the learning process. In so doing, students learn to analyze and understand learning contents and actively engage in the process.

The desire to improve instructional techniques can help in the quest for developing positive attitude toward teaching and learning Social Studies in Nigeria schools. It is also important to choose relevant instructional techniques in teaching Social Studies concepts for the purpose of simplifying the contents to the students. It has been expanded by Meltem and Serep (2016) who observed that learner's attitudes toward school is a determinant factor that predicts their academic achievement. The implication is that a positive attitude gives rise to positive result which can contribute to the contemporary need of student-centeredness teaching. Afamasaga (2017) revealed that students' attitude toward Social Studies significantly relate to their academic achievement. His research pointed the importance of the teacher as facilitator and the ultimate key that affect students' attitude to a subject and the resultant instructional objective which is academic achievement. Thus, there is a shift in the perception of the roles of the learners in the learning process. Instead of being viewed as passive recipients of information supplied by the teachers, students are perceived as active participants in the knowledge acquisition process (Anderson & Dill, 2018). They explained further that there is need for students' active participation in the learning process, and making them active regulators of their attitude in the pursuit of learning in an independent, active and deliberate manner is among the lofty objectives of conceptual diagram instructional technique. Conceptual diagram instructions create a logical, systematic, and organize the student's cognitive structure in learning at the junior secondary schools' level. To make the teaching process more effective and learning meaningful, Novac (2016) observed that conceptual diagrams is a way of representing concepts to the students for the purpose of developing cognitive and psychomotor skills. The cognitive structure in conceptual diagram instructional technique consists of a number of concepts that relate to each other by relationships, based on organized principles and hypotheses in a sequential way. This affirms that the conceptual structure is

organized in a distinguished way of vertical and horizontal relationships. The students should be able to express concepts graphically by a conceptual diagram and points to the conceptual structure; it is the first factor that judges if the new material intended to be learned was meaningful for learning. Conceptual diagram instructional technique can be used as a diagnostic tool to evaluate the student's learning as an alternative to the common tests in teacher centered instruction.

Some important advantages of using conceptual diagram technique is the exploring and the understanding of the specific aspects from the topic a teacher intend to teach, testing the students' understanding of the teaching goals, ability to make connections between the concepts, distinguishing the variables perceived by the students in the relationships between the concepts, exploring the basic concepts, and encouraging the discussion among the students. The strategy is useful to the teacher because it increases the teacher's perceptions about the components intended to be taught and provides the teachers with a clear and comprehensive picture about these concepts. It is helpful to the teachers in distinguishing between the students' correct ideas, planning the lessons, explaining the concepts and deciding the students' learning sequence. It also guides the students because it can help them in understanding of complex information and difficult concepts, ordering the concepts in an organized form, distinguishing the good concepts. The students could be asked to justify why they made decisions about where to place the concepts. The use of connectors, arrows, and descriptors that show relationships and non-relationships is important to indicate conceptual understanding.

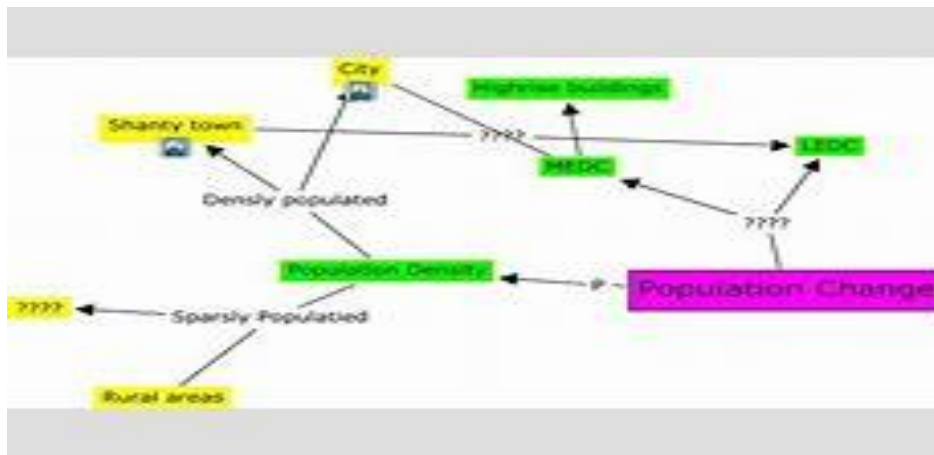


Figure 1: Concept charades

Source: Kathy Grey, Horowhenua College (developed within Beacon Schools in the senior Social Studies project)

To consolidate their learning, the students play “charades” with relevant concepts. The focus concepts are written on cards. A student chooses one and then has to act out the concept, either by mime or by using any words except the chosen concept. Other students have to guess the concept.

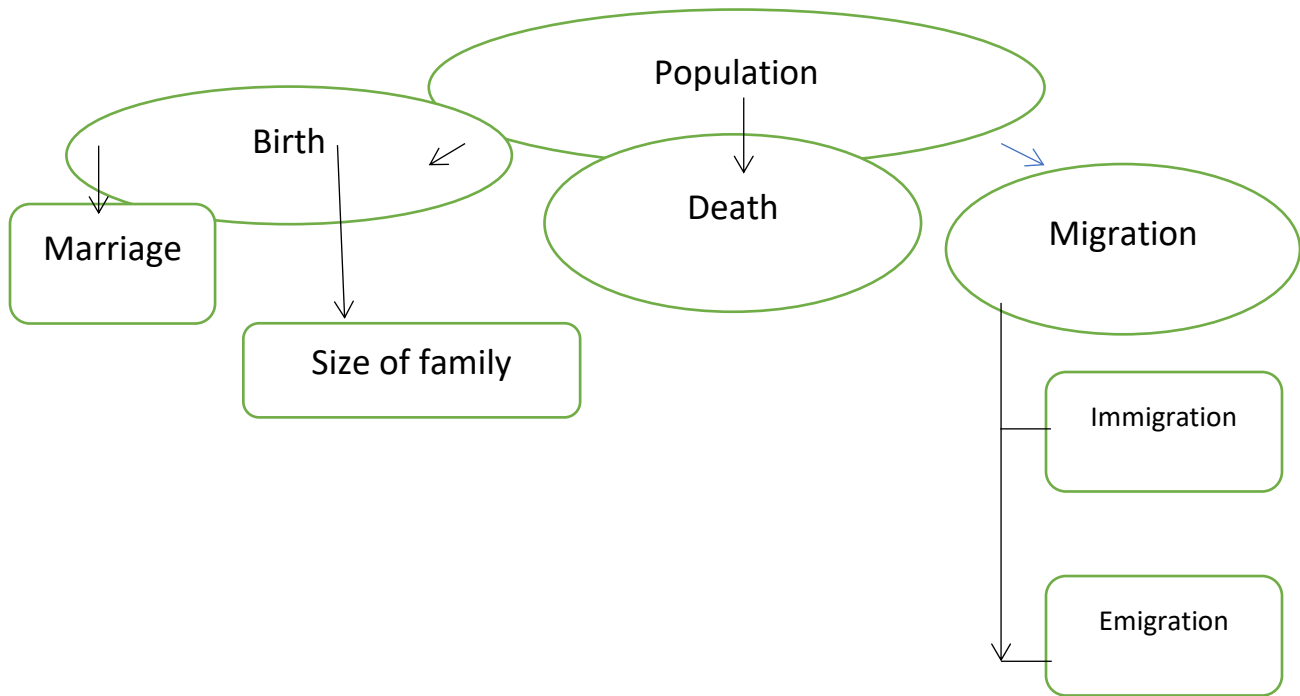


Figure 2: Concept arrows

Source: Frank Wilson, Raroa Intermediate

Students are placed in groups, and each group is given two concepts. Each group is asked to write a statement describing how their two concepts are linked, connected, or related to each other. Each statement shows a conceptual understanding. Connecting between the concepts and the previous conceptual structure, determining the relationships between the concepts, retaining the knowledge for longer periods of time.

Attitude refers to feeling's students establish toward Social Studies or other people. These feelings may imply favorable or unfavorable estimates that are possibly affecting the responses towards the person or the object under concern. Attitude form the motivational system inside individuals that determine the individual social response towards object or people. Students' attitude toward Social Studies is a factor that can develop the support of new normal learning perspective of students where it is vital to gain knowledge on their enhancement Ekpenyon (2015) is of the opinion that attitude composed of three correlated social components that differ in their extent between the individuals, namely; the cognitive component, the emotional component, and the behavior component as also supported by (Krathwohl, 2014).

Gender is considered one of the factors leading to inconsistent achievement of males and female students in Social Studies. That is why Ajaja (2019) considered conceptual diagram instruction as a technique that can improve students' achievement in mountain ecologies in Social Studies. While Krathwohl (2014) fund that males achieved higher than female in physical and population study. He also found conceptual diagram to be effective in improving students' achievement in different environment with sample characteristics of male and female students. The effects of gender on students' academic achievement for a long time been of concern to many researchers but no consistent result has been established. For instance, Aluko (2015) reports that gender have no effect on student's achievement in science because in science it is almost practical and activity-based learning so students can not be said to be affected because of gender. Although,

Shaibu and Mari (2017) explain that there is a significant difference between male and female student achievement in their ability to solve quantitative problems. While some researchers reported that male students achieved higher than female, others found no significant difference, hence the need to investigate whether students taught Social Studies using conceptual diagrams will achieve differently based on gender.

There is the need for employment of a teaching technique that is learner centered because it could improve students' academic achievement irrespective of school location and gender. Since it has been established that many teachers are using teacher centered teaching method and literatures available indicate lack of researches on the effects of conceptual diagrams and techniques on Social Studies students' achievement. This study is designed to examine the effects of conceptual diagram instructional technique on junior secondary school students' attitude and achievement in Social Studies in Biu, local government area of Borno state.

Statement of the Problem

The achievement of students in Social Studies as a social subject in the recent time has not been consistently good and encouraging (Erinosho, 2013). The Nigerian government, educational reforms, educators, parents and students themselves are concerned about the causes of this poor achievement. Mezieobi (2014) responded to the above scenario by emphasizing the need to use learner – dominated teaching techniques in teaching Social Studies concepts. Students' poor achievements in Social Studies in the Borno State Universal Basic Education Examination for many years constitute great worries to Social Studies Educators in the State. A comprehensive look at students' achievement in Social Studies shows that students' achievement in the subject area is low. A study conducted by Universal Basic Education 2017 shows that the achievement in Social Studies among students at junior secondary schools in Borno State is poor, the students' result from 2014 to 2019 indicate that the pass rate had for most part fallen below 50 %. The abysmal performance of students in Social Studies is worrisome, indicating that the quest to achieve national educational objectives and Social Studies objective through effective instruction may be difficult despite focuses on the best instructional method, strategies and techniques.

Conceptual diagrams are not given the suitable weight of importance in actual teaching process in junior secondary school Social Studies. The researcher, as a teacher of Social Studies education detected weakness in students' achievement as reported by Universal Basic Education in Borno state, the examination result between 2014 and 2019. In 2014 out of population of 23,113 that sat for junior secondary school examination 47% fail while 53% pass. In 2015, 12,379 students sat for the examination with 44% fail and 56% pass. Also, in 2016, 24,140 37% fail and 63% pass. 2017 out of population of 12,832, 41% fail and 59%, 2018 46% fail while 54% pass out of population of 13,613 and 2019 64% fail while 34% pass. Analysis shows that the level of students' academic achievement in Social Studies is fluctuating within 2014-2019 in Borno State.

Table 1
Students Achievement in Universal Basic Education Examination Performance

| Year | Total no. of Students | % Pass | %Fail |
|------|-----------------------|--------|-------|
| 2014 | 23113 | 53 | 47 |
| 2015 | 12379 | 56 | 44 |
| 2016 | 24140 | 63 | 37 |
| 2017 | 12832 | 59 | 41 |
| 2018 | 13613 | 54 | 46 |
| 2019 | 11246 | 34 | 64 |

Source: State Universal Basic Education Board Maiduguri

Reasons for the fluctuation in academic Achievement of students in Social Studies from research findings include teachers' teaching styles (Nyamwembe, Ondigi, & Kiio 2013) inappropriate method adopted in teaching Social Studies at the junior secondary schools' level, non-utilization of appropriate techniques among others. The Government and researchers are making frantic efforts to improve students' achievement through paradigm shift from the teacher-center method to the student-centered pedagogical approaches in teaching. Workshops have been organized by Borno State government in collaboration with National Teachers Institute Kaduna on how to enhance teachers' pedagogical skills which include teaching of Social Studies. Still yet student's achievement is low, if this is allowed to continue it will affect students who wish to continue with their studies in the area of social science and humanities. And hence the need to employ students' centered method such as conceptual diagram instructional techniques, and hence the needs for the present study on Effects of Conceptual Diagram Technique on Attitude and Achievement in Junior Secondary School Social Studies in Biu Borno State. Researchers have shown that conceptual diagrams technique has been successful in teaching disciplines like Mathematics, Biology and Chemistry. Thus, the need to use conceptual diagrams technique in teaching Social Studies to see if it will improve the attitude and academic achievement of students in Social Studies in Biu, Nigeria.

Aim and Objectives of the Study

The aim of this study is to investigate the effects of conceptual diagrams technique on attitude and achievement of junior secondary school students in Social Studies in Biu, Nigeria. Specifically, the objectives of the study are to:

1. find out the pretest and posttest attitude mean scores of junior secondary II students' towards Social Studies in experimental and control group in Biu, Borno State.
2. determine the posttest attitudes mean scores of JSS II students in Social Studies in the experimental group based on gender

Research Questions

The following research questions guided the study:

1. What is the pretest and posttest attitude mean score of junior secondary II students towards Social Studies in the experimental and control group in Biu, Borno State?
2. What is the posttest attitude mean scores of male and female students in Social Studies in experimental group Biu Borno state?

Hypotheses

The following hypotheses was tested at 0.05 level of significance.

1. There is no significant difference in the posttest attitude mean scores of students in Social Studies in the experimental and control groups in Biu local LGA Borno state
2. There is no significant difference between the posttest achievement mean scores of JSS II student in Social Studies in the experimental and control group in Biu LGA Borno state

Theoretical/Conceptual Framework

This study employed the theory propounded by David Ausubels' in 1962 and was further developed in 1978 titled 'Theory of Meaningful Learning'. And social interdependence theory propounded by Kurt Lewis (1935, 1948) and further developed by Deutsh (1949). The theorist believed that the construction of new knowledge is enhanced by the availability of background knowledge in the cognitive structure. The principle of Ausubels' learning theory is that new knowledge will mean something to a learner and was remembered when it is connected to pre-existing knowledge. The presence of relevant, clear and stable background knowledge in the learners' cognitive structure improves meaningful learning. It emphasis basic elementary behavioral processes such as stimulus perception, discrimination, and association, and more complex intricate behavioral processes such as problem solving, thinking, and creating lines as in domain of meaningful learning theory of David Ausubel.

In 1968, Ausubel introduced the concept of subsumption model as a pedagogical device in which central and highly unifying ideas are stated in terms of what is already familiar to the learners to which the learner can relate new ideas by subsumption. Ausubel argues that when current knowledge interacts with relevant background knowledge in the cognitive structure and is assimilated it forms a new knowledge structure. This new knowledge based on cognitive structure develops through the process of meaningful learning, thereby becoming more complex and helping students to solve problem. Ausubel proposed the use of advanced organizers (concept maps, conceptual diagrams, mind maps among others) in the absence of prior knowledge by the learner. These advanced organizers now serve as a prior knowledge or the pre-acquired ideas that was a link between a new concept to be learnt and the prior knowledge present in the learner cognitive structure.

Ausubel distinguished two types of learning as —rote and meaningful learning. When students encounter completely new unfamiliar material then rote learning as opposed to meaningful learning take place. Ausubel theory is relevant to this study because of the concerned of how individual learn large amount of meaningful materials from verbal contextual presentation in a school setting. Also, social interdependence theory was employed in this study to test the dependent variable which is Social Studies students' achievement. The social interdependence theory which clearly defines cooperation and competition was first proposed in 1900 by Kurt Koffka who proposed that groups were dynamic whole in which the interdependence among members could vary. In 1930, Kurt Lewis refined Koffka's notion, proposing that the essence of a group is the interdependence among members created by common goals. And that interdependence results in the group being a 'dynamic whole' so that a change in the state of any member or group changes the state of any other member or subgroup. This theory is chosen by the researcher because conceptual diagram technique in Social Studies uses group interaction, learning activity, and learner centered instruction. This provide for reflective thinking and team work

among the students which may help in achieving the Social Studies goal of preparing children to be good citizens by reflectively examining issues in the society.

This research work is therefore concerned with the meaningful learning theory of Ausubel by providing conceptual diagrams to the students and to see if it will enhance the academic achievement and attitude towards Social Studies among junior secondary school students in Biu Local Government Area of Borno State.

Methodology

The study adopted the quasi-experimental research design. The design was the non-equivalent pretest/posttest control group design which involves two groups, the experimental and control groups. The design was selected because it allows for separate determination of main effect as well as the interaction effects of both the independent and moderating variables on students' attitude and achievement. The quasi-experimental design allows the use of intact classes to be adopted because randomization was not possible. Moreover, true experimental design may not be acceptable to the secondary school administrators because of classroom groupings and school time table.

The population of this study consisted of all the 4282 junior secondary school students offering Social Studies from 30 junior secondary schools in Biu, Borno state. The data source is obtained from Borno State Ministry of Education, 2018. The population was made up of 2123 male and 2159 female. The sample of schools was made up of 4 junior secondary schools, to be selected from the 30 junior secondary schools that fall within the study area. The sample size was 216 students to form four intact classes from two urban and two rural junior secondary schools assigned for the experimental and control groups respectively.

The sampling technique for this study was the disproportionate stratified and simple random sampling technique because it gave chances of selection and representation of sampled schools. The researcher used two self-designed instruments to collect data for the study. The instruments are; Social Studies Achievement Test (SSAT) and Social Studies Students Attitude Questionnaires (SSAQ) for junior secondary school students. Content and construct validity were established for the instrument and trial-testing of the instruments produced reliability coefficient of .832 and 0.89 respectively, which is reliable.

The researcher adopted the descriptive and inferential statistics in analyzing the data for the study. The descriptive statistics mean and standard deviation was used to analyse data for answering the research questions. While ANCOVA was used to analyse data for testing the hypotheses formulated for the study. All hypotheses was tested at 0.05 level of significance using the Statistical Package of the Social Sciences (SPSS).

Results and Discussion

Answering research questions

Research Question One

What is the pretest and posttest attitude mean score of junior secondary II students towards Social Studies in the experimental and control group in Biu, Borno State?

To ascertain the pre-test and post-test attitude mean scores of students in Social Studies in the experimental and control groups, mean and standard deviation were employed to obtain the result for the groups as presented in Table 2

Table 2

Pre-test and Post-test Attitude of Students towards Social Studies in the Experimental and Control Groups

| Group | Test | N | \bar{X} | SD | Mean Gain | Mean Difference |
|--------------|-----------|----|-----------|--------|-----------|-----------------|
| Experimental | Pre-test | 65 | 52.03 | 9.150 | 43.59 | 33.24 |
| | Post-test | 65 | 95.62 | 14.713 | | |
| Control | Pre-test | 60 | 49.98 | 8.333 | 10.35 | |
| | Post-test | 60 | 60.33 | 10.823 | | |

Table 2 shows the pretest and posttest attitude mean score of junior secondary II students towards Social Studies in the experimental and control group in Biu, Borno State. Students taught Social Studies using conceptual diagrams technique and those taught with lecture method had pre-test mean scores of 52.03 and 49.98 with standard deviation scores of 9.15 and 8.33, respectively. The post-test mean scores of the experimental and control groups are 95.62 and 60.33, with standard deviation scores of 14.71 and 10.35, respectively. The mean gains were 43.59 and 10.35 for the two groups respectively with a mean difference of 33.24. This implies that conceptual diagrams technique does help change students' attitude positively towards Social Studies

Research Question Two

What is the posttest attitude mean scores of male and female students in Social Studies in experimental group Biu Borno state?

To ascertain the attitude, mean scores of male and female students in the experimental group. Mean and standard deviation were employed to obtain the attitude mean score of the two groups as presented in Table 3

Table 3

Post-test attitude Mean Scores of Male and Female Students in Social Studies in the Experimental Group

| Group | Gender | N | Post-test Mean | SD | \bar{x} - Difference |
|--------------|--------|----|----------------|-------|------------------------|
| Experimental | Male | 34 | 100.88 | 13.09 | 11.04 |
| | Female | 31 | 89.84 | 14.40 | |

The result presented in Table 3 shows the post-test attitude mean score of male and female students in Social Studies in the experimental group. Male students have a mean score of 100.88 with a standard deviation of 13.09 in the post-test attitude mean score of Social Studies students. The female students also have a mean score of 89.84 with a standard deviation of 14.40. The findings shows that male students in the experimental group have a higher mean score (100.88) than the female students when students were taught Social Studies using conceptual diagrams technique with a mean difference of 11.04. This implies that male students have a more positive attitude than female students in Social Studies after exposure to conceptual diagrams technique in Biu, Borno State.

Testing Hypotheses

Hypothesis One

There is no significant difference in the posttest attitude mean scores of students in Social Studies in the experimental and control groups in Biu local LGA Borno state

ANCOVA was used to determine the attitude mean scores of students in the experimental and control groups as presented in Table 4

Table 4

ANCOVA Result on Attitude Mean Scores of Students in Social Studies in the Experimental and Control Groups

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Squared | Eta |
|-----------------|-------------------------|-----|-------------|---------|------|-----------------|-----|
| Corrected Model | 39178.462 ^a | 2 | 19589.231 | 117.009 | .000 | .657 | |
| Intercept | 27127.015 | 1 | 27127.015 | 162.034 | .000 | .570 | |
| Covariate | 339.980 | 1 | 339.980 | 2.031 | .157 | .016 | |
| Group | 39156.299 | 1 | 39156.299 | 233.886 | .000 | .657 | |
| Error | 20424.738 | 122 | 167.416 | | | | |
| Total | 833421.000 | 125 | | | | | |
| Corrected Total | 59603.200 | 124 | | | | | |

a. R Squared = .657 (Adjusted R Squared = .652)

Table 4 shows the Analysis of Covariance (ANCOVA) result on significant difference between the pretest and post-test attitude mean scores of students in Social Studies in the experimental and control groups. From the result, $F(122) = 233.89$, $P < 0.05$, since the P-value of .000 is less than .05, the null hypothesis was therefore rejected, it was concluded that there is a significant difference between the post-test attitude mean scores of Social Studies students in the experimental and control groups. The result further shows an adjusted R squared value of .652, which means that 65.2% of the variation in the dependent variable which is students' attitude is explained by variation in treatment, while the remaining is due to other factors not included in this study. This implies that conceptual diagrams technique can help change students attitude positively towards Social Studies.

Hypothesis Two

There is no significant difference between the posttest attitude mean score of JSS II students in Social Studies in the experimental group based on gender.

To ascertain if a significant difference exist in the attitude mean scores of male and female students, after exposure to conceptual diagrams technique ANCOVA was used as presented in Table 5

Table 5
ANCOVA Result on Attitude Mean Scores of Male and Female Students in Social Studies in the Experimental and Control Groups

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Squared | Eta |
|-----------------|-------------------------|----|-------------|---------|------|-----------------|-----|
| Corrected Model | 2723.634 ^a | 2 | 1361.817 | 7.586 | .001 | .197 | |
| Intercept | 25244.443 | 1 | 25244.443 | 140.628 | .000 | .694 | |
| Covariate | 745.973 | 1 | 745.973 | 4.156 | .046 | .063 | |
| Gender | 2120.783 | 1 | 2120.783 | 11.814 | .001 | .160 | |
| Error | 11129.750 | 62 | 179.512 | | | | |
| Total | 608103.000 | 65 | | | | | |
| Corrected Total | 13853.385 | 64 | | | | | |

a. R Squared = .197 (Adjusted R Squared = .171)

Analysis of Covariance (ANCOVA) was conducted to determine if there is a significant difference between the attitude mean scores of male and female students taught Social Studies using to conceptual diagrams technique. Table 10 shows that the F-value for gender is 11.81 with significant P-value of .001 which is less than .05 level of significance. The null hypothesis was therefore rejected, it was concluded that there was a significant difference between the attitude mean scores of male and female students taught Social Studies using conceptual diagrams technique. The result further shows an adjusted R squared value of .171 which means that 17.1% of the variation in the dependent variable which is students' attitude is explained by variation in gender, while the remaining is due to treatment and other factors not included in this study. Hence, conceptual diagrams technique can help change both male and female students' attitude in Social Studies in favour of male students.

Discussion of findings

The study revealed that Conceptual diagrams technique was found to be effective in positively changing the attitude of secondary school students in Social Studies as shown in the result that there is a significant difference in the attitude of students in Social Studies in the experimental and control groups. This is an agreement with the findings of Linkando (2019) who noted that reflective practice when used in Social Studies classroom can develop critical thinking, inductive thinking, problem solving, analysis, and reflective inquiry or reflective thinking among others. It also corroborates the findings of Coulibaly (2021) on teaching Social Studies with models reveals that there was significant difference between the mean achievement score of students taught Social Studies using models and conceptual diagram. So, applying the use of concept diagram can be experiment to see how effective it can help in improving achievement of student in Social Studies.

The result revealed that treatment has an effect on the attitude of male and female students in favour of males. This agrees with the findings of Dennis, Kaumba and Jack (2016) who found that conceptual diagrams does improves students positive attitude towards learning. Zan and Martino (2017) attitude towards Social Studies education is just a positive or negative emotional disposition towards Social Studies education. Considering attitude towards Social Studies education from multidimensional perspectives, it interprets students' attitude towards Social

Studies education as a more complex scenario characterized by the emotions that one associates with Social Studies education, one's beliefs about Social Studies education and how one behaves towards Social Studies education

Conceptual diagrams technique was found to be effective in improving the achievement of secondary school students in Social Studies as shown in the result that there is a significant difference between the posttest achievements of students in the experimental and control groups. This corroborates the findings of Owolabi and Oginni (2013) who opined that conceptual diagrams allow students to follow along with the teaching and build learners' understanding of each concept with the teacher. It also allows the teacher to informally assess students' knowledge as the lesson progresses.

The result revealed that treatment has no effect on the achievement of students based on gender. Onekutu (2022), boys and girls at early ages perform equally in all subjects including English language and as they grow to higher classes, the females begin to get more interested in language arts, while the male counterparts take more to sciences and social sciences. This has resulted to a situation where there are more male students' academic achievement has remained controversial. While some propose that, male perform better than females in achievement tests, others argue against it, Venion (2017), many comparisons show average scores of boys and girls to be the same on general intelligence test.

Conclusion and Recommendation

Based on the findings of the study, it could be concluded that the use of conceptual diagrams strategy has the potentials of helping to foster cooperation, mutual trust, understanding and more effective communication sharing other peoples' world views and ultimately lead to improved knowledge of students in Social Studies classroom for democratic living in our dear country Nigeria. Hence, the future of the Nigerian state will become surer and among the citizens, peaceful co-existence will tend to hold sway in different parts of the country if Social Studies is given a pride of place through the conceptual diagram strategy in Nigerian Secondary Schools.

Based on the findings of this study the following recommendations were deemed necessary:

1. To sustain the effectiveness of conceptual diagram technique on students' attitude and achievement, teachers should frequently incorporate conceptual diagram technique into their methodology when planning their lessons in Social Studies and other related courses.
2. Curriculum developers in Social Studies should incorporate more conceptual diagram activities into the Social Studies curriculum and make it more practical and easier to understand.
3. Also, they should popularize conceptual diagram instructional strategies by recommending its use to teachers in the curriculum of Social Studies.
4. Teachers' Associations such as Social Studies and Social Studies Association of Nigeria (SOSCEAN) should organize seminars and workshop for teachers in order to make them familiar and interested in the use of the conceptual diagram instructional strategy in the teaching of Social Studies and other related courses.
5. Gender should not be a barrier to students' interest and achievement thus; teachers should ensure equal opportunity to students regardless of sex in classroom learning situations.
6. Conceptual diagram instructional strategy should be included in the pre-service teaching methods at the Nigeria Certificate of Education (NCE) and degree programmes and be practice during the teaching practice exercise.

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