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The Effect of Concept Mapping Strategy in Social Studies Instruction on Students' Learning Outcomes in Junior Secondary Schools, Lagos State, Nigeria

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Abstract: The study investigated the effect of concept mapping strategy in social studies instruction on students learning outcome in Lagos State junior secondary school. The study's goal is to ascertain whether the Concept Mapping Teaching Strategy (CMTS) improves students' social studies learning outcomes. One hundred and sixty students in JSSII intact classes were used as sampled. The participants were drawn from four schools located at Badagry zone in Education District V. One hundred and two students were taught with CMTS and fifty-eight students were taught using conventional method. Gender was the moderating variable and was considered as factor that can influence students' learning outcome. Two research questions were raised and two null hypotheses were formulated to guide the study. The study employed a quasi-experimental research design. The design employed a 2x1x1 factorial matrix. The Social Studies Achievement test was used to collect data for the study. Data collected were analyzed with mean, standard deviation and analysis of covariance (ANCOVA) at 0.05 significant level. Results showed that students who received the Concept Mapping Teaching approach performed well in academics (F-value $7.77_{(2, 145)}$ $p<0.05$), and that gender is not a factor in using CMTS in Social Studies class which shows that the F-value $1.001_{(1, 145)}$ is not significant at 0.05. The study came to the conclusion that CMTS improved deep learning in social studies. According to the study, junior secondary schools in Lagos State should generally use the therapy on a big scale.

Keywords: Concept mapping strategy, social studies, instruction, conventional strategy, learning outcome

1. Introduction

The junior secondary school social studies curriculum aims to provide students with the attitudes, values, abilities, and information necessary for a cohesive social existence in Nigerian society (Mezieobi, 2011). The social studies curriculum in schools offers integrated systematic study employing subjects like archaeology, economics, anthropology, geography, political science, law, history, religion, etc., in addition to valuing material from the humanities, mathematics, and natural sciences. It is a multidisciplinary investigation of a subject, issue, problem, worry, or aspiration (Ogundare, 2000).

Teachers of social studies classes constantly seek new strategies and teaching techniques to help students learn more effectively and to encourage a positive attitude or interest toward the subject. Learning is a proactive, intelligent, and complex process (Cheema & Mirza, 2013). Learning involves a complex interacting system that includes environmental, social, motivational, emotional, and cognitive components. This is a crucial characteristic of learning (Cheema & Mirza, 2013). Numerous teaching-learning techniques have been created to speed up student's learning. Most school conduct policies now in use in Nigeria involve passive student behaviour during lessons and a predominately teacher-dominated classroom (Oche, 2012).

Education professionals and scholars from all around the world are paying close attention to how instructional strategies affect students' performance. How students are taught has a significant impact on what they learn (Abdulhamid, 2013). In Nigeria, over the past few decades, the standard of students' performance at all educational levels has significantly decreased, claims Oche (2012). Numerous causes with psychological and environmental roots can be linked to the decline in academic standards. There is no question that the teaching strategies used by instructors in schools are

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to blame for the decrease in performance quality at the secondary school level. Sequeira (2012) emphasised that some education techniques encourage passive instead of active learning. Researchers and educators have frequently noted the problems with strictly lecture-based instruction.

Hassan et al. (2015) opined that teaching methods are the approaches, methodologies, and procedures that a teacher uses to carry out his lesson successfully. Principles and instructional practice make up teaching approaches (Daluba, 2013). The tools a teacher uses to accomplish the predetermined aims and objectives are called teaching methods. Students use learning techniques to increase their understanding of new material (Liu, 2009). According to Harrison, Andrews, and Saklofske's (2003) research, students who use the proper learning techniques when doing academic assignments perform better than those who don't. To assist learners in overcoming some of the learning challenges, various learning strategies are employed in social studies classes.

Pedagogical approaches like problem-solving, inquiry, simulation, discussion, dramatisation, questioning, presentations, construction, creative activity, concept mapping, and many others have improved deep learning in social studies. The goal is to make learning more engaging and less complicated.

Students experience difficulties in learning because they must fully understand concepts and principles of the subject that are sometimes impossible to see or comprehend (Odell, Korgen, & Wang, 2005; Bauman et al., 1992). In addition to these difficulties, teachers 'view of what constitutes effective teaching and learning influences their choice of instructional strategies. Whatever method is used, the student's prior knowledge is essential.

Prior knowledge has been shown to influence the quality of learning and students 'achievement in a meaningful manner (Liu, Lin, & Pass, 2014). It is generally agreed that learning outcome is determined by many factors interacting. When introducing new concepts to pupils, teachers must find out what they already know about them because this is a crucial learning influencer (Ausubel, Novak, & Hanesian, 1978; Lakpini, 2006).

The concept mapping method of teaching social studies could be helpful because it actively involves students in practical classroom tasks (Eneasato, 2010). A map must contradict one's presumptions, reveal unexpected linkages, and depict the unknowable (Imoko & Agwagah, 2006). Concept mapping is employed in educational settings to facilitate brainstorming, note-taking, memory retention, summarisation, the production of new knowledge, and to promote meaningful learning (Imoko & Agwagah, 2006). Concept mapping, Cakir (2008) claimed that it is a flowchart-like graphical depiction of ideas or concepts that shows how they relate to one another. It is a visual depiction that makes it possible to build a comprehensive knowledge that words alone cannot (Plotnick, 1997 in Imoko & Agwagah, 2006).

A concept map is a graphic organiser that helps students represent their knowledge and organise their classes. Concept maps begin with a primary idea (or concept) and then zoom out to show how it may be broken down into several topics. It is divided into two nodes (circles), and links between them form a hierarchy (lines). Nodes typically represent various concepts, whereas links indicate how concepts relate to one another (Walker, 2002). The nodes are labelled with words to describe the connections between them explicitly and are arranged from general to specific, connected by directional lines.

Students that use the idea mapping method of learning must show how a group of concepts link to one another and combine new information with past knowledge (Plotnick, 1997). Students evaluate whether and how newly learned material relates to what they already know about a particular topic by reflecting on their prior knowledge. The concept mapping method is effective because it enables students to connect information visually, which enhances their understanding of the content (Aidman & Egan, 1998).

Researchers compared the efficacy of concept mapping to different learning techniques, and the results revealed that students who used concept mapping scored better than those who utilised underlining, taking notes, speaking with other students, or outlining (Hilbert & Renkl, 2008). The idea mapping method is excellent for locating students' misconceptions. Students' concept maps demonstrate how much they have understood. Teachers can identify weaknesses in concept maps through student and instructor analysis, allowing them to be fixed before students try to base their knowledge on incorrect information.

Idea maps made by teachers, students, concepts, and propositions fall into four categories. All concept maps created by teachers are offered to students as a study tool (Lim, Lee, & Grabowski, 2009). In contrast, student-generated idea maps are entirely created by the students (Harpaz, Balik, & Ehrenfeld, 2004). Students must finish partially constructed idea maps by choosing the proper concepts to place in the nodes (Wang & Dwyer, 2006). Proposition-identifying concept maps are similar to incomplete concept maps in that they are unfinished. Still, students fill them out by providing linking words between concepts to create propositions or node-link networks instead of choosing the right ideas to place in the nodes (Wang & Dwyer, 2006).

Despite idea mapping's clear benefits as a learning strategy, further research is still needed. Some researchers claim that not all idea mapping learning methods are equally effective (Karmintoro et al., 2021). For students to benefit from the many concept mapping approaches and the most practical learning strategies, more research must be done on their efficacy. Numerous academic studies looking at concept mapping as a learning strategy have used samples of high school, undergraduate, or graduate students to support the claim, as mentioned earlier.

Few studies Astawa (2019) included students from middle school grades, and just one of those studies (Guastello, Beasley, & Sinatra, 2000) included junior secondary school students (the junior secondary). Since idea maps have been proven effective in promoting meaningful learning, students should be taught how to use them. However, there are

conflicting results about the effectiveness of the various idea mapping techniques, prompting additional research to ascertain which concept mapping technique would be most beneficial in increasing students' achievement.

Danmole & Femi-Adeoye (2004) assert that teachers must evaluate learning concepts to determine their degree of complexity, abstractness, and sophistication. Students will learn things more quickly as a result of this. Thanks to this study, teachers can assist students in making links between topics. To help teachers choose what to teach, how to teach it, and how to grade students in social studies, this study aims to determine the effect of idea mapping approaches on learning outcomes.

1.1 Research Questions

The problems in this study are as follows:

a) What effect of concept mapping and conventional teaching strategies on students' learning outcomes in social studies?
b) What is the effect of gender on the learning outcome of students in social studies when taught through concept mapping and conventional means?

1.2 Hypotheses

The hypothesis in this study is as follows:

Ho_1: There is no significant effect of concept mapping and conventional teaching strategies on students' learning outcomes in Social Studies.

Ho_2: There is no significant impact learning outcome of students in social studies when taught through concept mapping and conventional means based on gender.

2. Methodology

2.1 Research Design

A quantitative research method was employed for data collection in this study. The quantitative approach entails a quasi-experimental research design which involves pre-test, post-test experimental and control groups.

2.2 Population Sample of the Study

The target population for the study for which generalisations were made consisted of students in Lagos State Public Junior Secondary Schools, having a total population of 337.724 with 349 Junior Secondary Schools (Akinyemi, Lawal, & Owosoro, 2021). The population covers male and female students from all the Junior Public Secondary Schools in Lagos State.

The sample for the main study comprised 160 participants whose ages ranged from 12-17 years of junior secondary school II and were selected from six sampled co-educational schools in Lagos State Education District V.

Lagos State is clustered into six Education Districts. Still, Education District V was randomly selected from the six Education Districts, and simple random sampling techniques were adopted to select four schools from the Badagry zone in Education District V. The schools were co-educational schools because gender is one of the moderating variables in the study. Intact classes of JSS II in the sampled schools were involved in the study.

2.3 Instrument for Data Collection

The instrument used for collecting data was Social Studies Achievement Test (SSAT). The Social Studies Achievement Test (SSAT) was used to determine students' level of learning social studies concepts. It contains sections A and B. Section A contains items on the Bio data of the students and information on parents' educational background. Section B comprised twenty-five (25) multiple choice objective test items with four options per item. The questions were adapted from past questions for Junior Secondary Certificate Examination on Social studies (JSCE) 2015-2021. The questions covered the resource concepts of the first term JSSII of the Social studies syllabus as stipulated in the National Curriculum for Junior Secondary Social studies and Lagos State Ministry of Education modified scheme of work. The validity of the SSAT, being a standardised test, had been established by the Lagos State Examination Board.

The test-retest reliability was performed using 50 students from two public junior secondary schools that were not part of the schools for the significant study on two occasions of an interval of two weeks. K-21 were used to determine the reliability of the Social Studies Achievement Test (SSAT). The Social Studies Achievement Test (SSAT) was a reliable index of 0.81.

2.4 Data Collection and Analysis

The Pre-test was administered to all the groups together. After that, the students were divided into control (conventional) and experimental (concept mapping) groups. Each of the groups received a treatment. The subjects in experimental group

1 were exposed to the topics and resources in social studies adopting the Concept Mapping Teaching Strategy. The conventional method of teaching was used to teach the control group. However, the scores of all the subjects were taken before and after the treatments. The treatment lasted for four consecutive weeks.

The post-test is a comprehensive test on the same topics that participants had attempted in the pre-test, irrespective of whether they were in the treatment group or controlled group. The question items drawn on social studies from junior secondary school (JSS) examination organised by Lagos state ministry of education were administered to them. The participants (students were tested with the social studies' academic achievement test at the end of the 4-weeks of treatment).

The data obtained from the administration of the instrument were analysed thus:

Descriptive analysis: The descriptive statistics include arithmetic means and standard deviation for answering the research questions.

3. Results

Based on the study's declared research questions and hypotheses, the data analysis's findings. The results were interpreted, and each of the hypotheses was either rejected or not rejected at a 0.05 level of significance.

Table 1: Distribution of respondents by teaching strategies and gender

Variable	Factor	F	%
Teaching strategies	Concept Mapping	102	63.8
	Traditional	58	36.3
Gender	Male	72	45.0
	Female	88	55.0

According to Table 1, a total of 160 students participated in the study, with 72 of them being men (corresponding to 45%) and 88 being women (corresponding to 56.6%). In addition, Table 1 shows that 102 of the 160 students who took part in the study, or 63.8%, were in the idea mapping strategy group, compared to 58 students (or 36.3%) in the traditional strategy group.

3.1 Research Questions

Descriptive statistics were applied to the acquired data to answer the study questions. The result of the descriptive statistics of means is presented in Tables 2 to 3.

3.1.1 Research Question 1

What is the effect of using concept mapping and conventional teaching strategies on students' learning outcomes in social studies?

To answer the research question, the data collected were subjected to descriptive statistics of means. The result of the descriptive statistics of means is presented in Table 2.

Table 2: Concept mapping & conventional method

Treatment	N	Mean		Mean Diff.	SD		SD Dif.
		Post-test	Pre-test		Post-test	Pre-test	
Concept Mapping	102	16.25	12.40	3.85	2.654	3.432	-0.778
Traditional	58	12.84	11.03	1.81	3.538	3.233	0.305
Total	**160**	**15.11**	**11.74**	3.37	**3.571**	**3.510**	0.061

According to Table 2, the idea mapping group's pupils had the highest average score, with a mean difference of 3.85 and a standard deviation of -0.778. The students in the traditional teaching technique group, however, had the most minor mean difference (1.81; SD = 0.305).

3.1.2 Research Question 2

The gathered information was exposed to descriptive statistics of means to respond to the study topic. The result of the descriptive statistics of means is presented in Table 3.

According to Table 3, the concept mapping group's female students performed the best in learning outcomes, with a mean difference of 4.30, while the group's male students had a mean difference of 3.44.

Table 3: Effects of gender on learning outcome of students in social studies when taught with concept mapping and traditional teaching strategy

Treatments	Male			Female		
	Post-test	**Pre-test**	**Mean Diff.**	**Post-test**	**Pre-test**	**Mean Diff.**
Concept Mapping	16.28	12.84	3.44	16.22	11.91	4.30
Traditional	12.95	11.79	1.16	12.79	10.67	2.13
Total	**15.35**	**11.82**	**3.53**	**14.91**	**11.67**	**3.24**

3.2 Tests of Hypotheses

Table 4 summarises the main and interaction effects of treatments, gender, and level of attitude of students. The table shows the outline of the findings of all the hypotheses in the study, and each of the hypotheses is extracted from the table.

Table 4: Main and interaction effect of treatment, gender, and attitude on students' academic performance

Source	Type III SS	Df	MS	F	Sig.	$p\eta^2$
Corrected Model	1152.281[a]	14	82.306	13.641	0.000	0.568
Intercept	709.027	1	709.03	117.51	0.000	0.448
Pre-test	641.436	1	641.44	106.31	0.000	0.423
Treatment	93.792	2	46.896	7.772	0.001	0.097
Gender	6.041	1	6.041	1.001	0.319	0.007
Level of attitude	21.003	2	10.502	1.74	0.179	0.023
Treatment * Gender	30.043	2	15.022	2.49	0.086	0.033
Treatment * Level of attitude	10.425	2	5.213	0.864	0.424	0.012
Gender * Level of attitude	18.681	2	9.34	1.548	0.216	0.021
Treatment * Gender * Level of attitude	6.956	2	3.478	0.576	0.563	0.008
Error	874.913	145	6.034			
Total	38539	160				
Corrected Total	2027.194	159				

a. R Squared = .5608 (Adjusted R Squared = .527)

3.2.1 Hypothesis 1

H_{O1}: The hypothesis states there is no significant difference in the learning outcome of concept mapping and conventional teaching strategies on students' learning outcomes in Social Studies.

To test the hypothesis, the data collected were subjected to descriptive statistics of means and analysis of covariance (ANCOVA). The result of inferential statistics of the ANCOVA is presented in Table 4

Table 5: Effects of treatment (concept mapping) and conventional methods on students' learning outcome

Source	Type III SS	df	MS	F	Sig.	$p\eta^2$
Corrected Model	1152.281[a]	14	82.306	13.641	0.000	0.568
Treatment	93.792	2	46.896	7.772	0.001	0.097
Error	874.913	145	6.034			

R^2 Squared = .568 (Adjusted R^2 = .527)

The F-value of 7.77 (2.145) is significant at 0.05, as shown in Table 5. As a result, there is a strong main effect of treatment on students' Social Studies learning outcomes. The independent factors explained 56.8% of the variation in students' Social Studies learning outcomes, according to the R-Squared. According to the partial eta squared estimate, the treatments were responsible for 9.7% of the variance in the student's learning outcomes in social studies seen in the post-test. This suggests that in the following therapy, pupils in the treatment groups learned more about social studies than their peers in the control group.

3.2.2 Hypothesis 2

The hypothesis states there is no significant main effect on the learning outcome of students in social studies when taught through concept mapping and conventional means based on gender.

To test the hypothesis, the data collected were subjected to analysis of covariance (ANCOVA). The result of the ANCOVA is presented in Table 6.

Table 6: Learning outcomes & gender

Source	Type III SS	Df	MS	F	Sig.	$p\eta^2$
Corrected Model	1152.281[a]	14	82.306	13.641	0.000	0.568
Gender	6.041	1	6.041	1.001	0.319	0.007
Error	874.913	145	6.034			

Table 6 shows that the F-value of $1.001_{(1, 145)}$ is insignificant at 0.05. It follows that there is no significant main effect of gender on students learning outcomes in Social Studies when taught through multiple representations and concept mapping. The partial eta square (0.007), which is very small, indicates that the effect size is minimal. Despite the insignificant difference, the chart below shows the level of attitude with the better effect. Figure 1 shows that while the mean for males is 14.967, that of females is 15.473, which indicates that female respondents are better than their male counterparts.

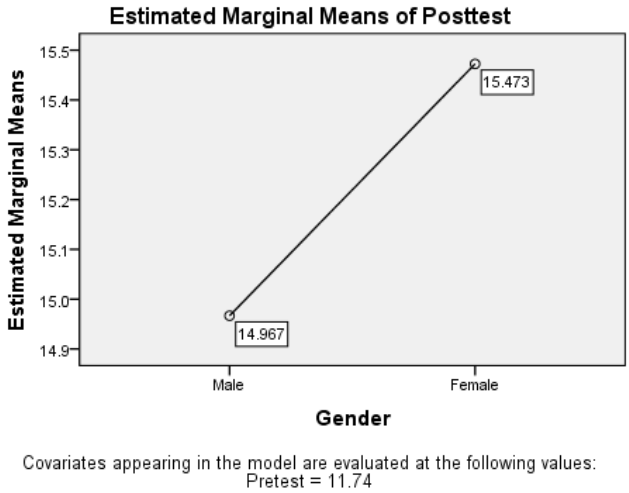

Fig. 1: Mean test between male and female

4. Discussion of Findings

In Lagos State's junior secondary schools, the idea of mapping strategy's impact on social studies instruction and student learning outcomes were uncovered by the study. According to the research's findings, the F-value of 7.77(2.145) is significant at 0.05. As a result, there is a strong main effect of treatment on students' Social Studies learning outcomes. Overall, the results showed that students who received concept mapping instruction outperformed those who received traditional instruction in academic performance. Sequeira (2012) emphasised that some education techniques encourage passive rather than active learning. According to Abdulhamid (2013), how students are taught has a significant impact on what they learn. According to Harrison's et al. (2003) research, students who use the proper learning techniques when doing academic assignments perform better than those who don't. The study's findings show that using the therapies—specifically, the concept mapping strategy—improves Social Studies learning outcomes. When concept mapping was utilised to instruct some concepts in social studies, Adeneye (2011) obtained an unsettlingly good effect. Similar findings were made in Awodun (2017), who discovered a significant difference between the post-test mean scores of the students using the idea mapping approach and those in the control group. Additionally, Adaramola (2012) looked into how concept mapping affected the interest and performance of dyscalculic students in secondary school mathematics. She discovered a significant difference between the mean scores of the experimental and control groups, but gender had no discernible effect on the student's comprehension.

Using gender and locus of control as intervening variables, Bilesanmi-Awoderu (2002) examined the relative efficacy of idea mapping and lecture approaches on the academic achievement of Nigerian junior secondary school students in social studies. Since this tactic has been demonstrated to be beneficial in the instruction of students, irrespective of their gender and locus of control, they concluded that teachers should apply it while instructing both male and female students.

According to Adebayo (2006), the results did not agree with those of other studies of a similar nature. Still, they supported the findings of studies by Awodun (2017), Adaramola (2012), and Adeneye (2011), which demonstrated that the concept mapping strategy was more effective than the traditional conventional method in raising students' achievement.

In a study conducted by Aishana (2007) on concept mapping instructional strategy and expository method in a mathematics class, the study was conducted on 300 Junior Secondary school students (JSS 2) from five (5) schools in the

Federal Capital Territory used a t-test and concluded there was no significant difference between students that were exposed to concept mapping those exposed to the expository method. However, there was a substantial difference in performance between boys and girls; the boys performed better than the girls but concluded that concept mapping is effective in concept acquisition and capable of stimulating students resulting from their interactions and discussions of the topics.

According to Danmole & Femi-Adeoye (2004), teachers should evaluate concepts intended for learning and identify their level of complexity, abstractness, and sophistication to lessen the difficulty students have when learning concepts. It is therefore suggested that for maximum effectiveness, intervention should include training and re-training of Social Studies teachers in teaching strategies and methods capable of enhancing active participation and improving learning outcomes.

The F-value of 1.001 (1.145) is not significant at 0.05, according to Table 5. It implies that when teaching social studies via concept mapping, gender has no discernible main effect on the learning outcomes of the students. Some researchers discovered no difference between males and girls, while others found significant gender variations in pupils' performance in social studies (Ogonnaya et al., 2016; Okonkwo, 2012; Qarareh, 2010). These include the instructional methods used, one's religious convictions, one's economic situation, one's cultural background, and so forth.

Gender has remained an issue in both enrolment and achievement amongst social studies students in junior secondary school (Oliver et al., 2017; Olson & Banjong, 2016; Mbamara & Eya, 2015). Girls think and learn differently and interact with equipment differently from boys. This implies that teaching methods and strategies could be gender biased. Research efforts are therefore geared toward determining the instructional design that could appeal equally to both male and female learners. There is a paucity of research-based information and a lack of agreement on how gender influences or combines multiple representation strategies to determine achievement in social studies (Appoji & Shailaja, 2017). Some other studies (e. g Pearsall, Skipper, & Mintzes, 1997) show that female university students produce more complex representation than their male counterparts. This was true for the college students in Martin, Mintzes, & Clavijo's (2000) study, which used a modified version of Novak & Gowin's scoring system to assess the structural complexity and propositional validity of representation. The reasons for such divergent results are not obvious, and they call for more research. It is therefore expedient to examine the moderating effect of gender and or its interaction with concept mapping instructional strategy on the achievement of students in social studies, and this formed the inclusion of gender as a variable in this study (Novak & Gowin, 1984).

According to Abimbola (2004), gender does not significantly affect students' ability to conceptualise information. Similarly, Bilesanmi-Awoderu (2002) found no main effect of gender on the experimental treatments. Additionally, Candan, Türkmen, & Çardak (2006) discovered that when a specific teaching strategy is used in the classroom, there is no statistically significant difference between students' academic performance based on gender. For further clarification, Ikwumelu & Oyibe (2014) found that when the self-direct learning technique is applied, there is no discernible difference between the mean achievement of male and female students. One of the self-directed learning techniques is concept mapping. Even though some earlier research had shown that concept mapping improved students' performance during instruction, a few others had shown that its impact was insignificant. Such disparate outcomes might not diminish the value of concept mapping, mainly when the results are thoroughly analysed. The limited achievement of social studies objectives and learners' incapacity to use the knowledge and abilities they learned in social studies are the driving forces behind the need for the current study. This bottleneck may have been caused by poor teaching techniques (Adeyemi, 2008). Learners only receive rote instruction, which leaves little possibility for information retention and application. In order to promote meaningful learning, it is necessary to establish a child-centred approach to education. To improve student performance and increase learners' capacity to address the myriad societal issues, it is required to review educational methods.

5. Conclusion and Recommendations

The main goal of this study generally is to show the effectiveness of the Concept Mapping teaching strategy on students' learning outcomes in social studies, and the domain of interest is Lagos State Junior Secondary Schools. This study equally seeks to find the moderating effect of the treatment; that is, Concept Mapping teaching strategy based on gender (male/female). It was affirmed that students exposed to concept mapping teaching strategies had improved positive performance in Social Studies. Thus, this study has shown that the treatments (concept mapping) are relevant and efficacious in enhancing students' learning outcomes.

Because of this, the following recommendation is made: 1) Social Studies teachers should be trained always to adopt students centred approaches in the classroom, 2) the government should subsidise textual materials, and teachers should be adequately equipped with necessary and relevant materials appropriate to achieve instructional objectives, and 3) the study showcased the strength of the Concept Mapping teaching strategy, it will therefore be recommended that Social Studies teachers be given training and re-training in the area of teaching strategies and methods capable of enhancing active participation and improved learning outcome.

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