OPEN ACCESS
World Journal of Arts, Education and Literature
ISSN (Online): 3049-0766 | Vol. 3, No. 5, May. 2026
Website: https://wasrpublication.com/index.php/wjael

EFFECTS OF CONCEPTUAL DIAGRAMS TECHNIQUE ON SCHOOL LOCATION-BASED ATTITUDE AND ACADEMIC ACHIEVEMENT OF JUNIOR SECONDARY SCHOOL STUDENTS IN SOCIAL STUDIES IN BIU, BORNO STATE

Gambo Baranzi Mbaya[1*], Prof. Dauda Adeyemo Ariya[2] & Prof. Ruth A. R. Irmiya[3]

Department of Social Science Education, Faculty of Education, University of Jos.

Received: 17/03/2026	Accepted: 27/04/2026	Published: 19/05/2026

Abstract: This study investigated the effects of Conceptual Diagrams Technique (CDT) on school location-based attitude and academic achievement of Junior Secondary School students in Social Studies in Biu Local Government Area, Borno State, Nigeria. The study was guided by three research questions and three hypotheses. A quasi-experimental research design of the non-equivalent control group pre-test–post-test type was adopted. The population comprised 4,282 Junior Secondary School II students, while a sample of 216 students drawn from four intact classes participated in the study. Two research instruments, the Students' Attitude to Social Studies Questionnaire (SASSQ) and the Social Studies Achievement Test (SSAT), were used for data collection. Data were analyzed using mean and standard deviation, while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. Findings revealed that there was no significant difference in the attitude of urban and rural students exposed to CDT. However, students taught Social Studies using CDT achieved significantly higher academic scores than those taught using the conventional lecture method. Furthermore, no significant difference was found between male and female students' achievement when taught using CDT, although females had slightly higher mean scores. The study concluded that CDT is an effective, learner-centred instructional strategy for improving students' academic achievement in Social Studies irrespective of school location and gender. It was recommended that Social Studies teachers should adopt CDT to enhance meaningful learning and improve students' performance.

Keywords: Conceptual Diagrams Technique, Social Studies, academic achievement, school location and attitude.

Introduction

Education remains one of the most important instruments for national development because it equips individuals with the knowledge, skills, values, attitudes, and competencies required for effective participation in society. Education contributes significantly to economic growth through human capital development, innovation, and workforce productivity while also promoting social cohesion, poverty reduction, democratic participation, and sustainable development (UNESCO, 2016; United Nations, 2023). In contemporary societies, education is recognized as a catalyst for personal empowerment and societal transformation because it enables individuals to acquire the intellectual and practical capabilities necessary for addressing social, political, and economic challenges. Consequently, governments across the world continue to invest in education as a strategic means of achieving national development goals and improving citizens' quality of life (World Bank, 2020).

In Nigeria, Social Studies occupies a strategic position in the school curriculum because of its role in promoting citizenship education, national consciousness, social responsibility, and value orientation among learners. The subject was introduced into the Nigerian educational system to address social problems, inculcate desirable values, and prepare learners for responsible participation in society (NERDC, 2017). Social Studies contributes to the realization of national educational objectives through the promotion of unity, patriotism, peaceful coexistence, democratic values, and global citizenship. According to Oduolowu (2023), one of the primary objectives of Social Studies education is the development of informed and responsible citizens capable of contributing meaningfully to national and global development. Similarly, Akinlaye and Bolarinwa (2021) observed that Social Studies provides learners with opportunities to understand social realities, appreciate cultural diversity, and develop skills for solving societal problems. Social Studies is an integrated discipline that draws concepts, principles, and theories from various social science fields such as Sociology, Geography, Economics, Political Science, Anthropology, and History. The integration of these disciplines enables learners to understand themselves, their environment, and the wider society from multiple perspectives. Through Social Studies instruction, students develop critical thinking, decision-making, communication, and problem-solving skills that are necessary for effective citizenship (Mezieobi & Mezieobi, 2019). The subject is also designed to help learners acquire positive attitudes and values that encourage social responsibility, environmental consciousness, and civic participation. Therefore, effective teaching and learning of Social Studies are essential for achieving the goals of the Nigerian educational system.

Despite the recognized importance of Social Studies, students' academic achievement and attitude toward the subject have continued to attract concern from educators, curriculum

*Corresponding Author
Gambo Baranzi Mbaya*

This is an open access article under the CC BY-NC license

planners, parents, and government agencies. Reports from public examinations and classroom assessments indicate that many students experience difficulties in understanding and applying Social Studies concepts to real-life situations. The Chief Examiners' Reports on Junior Secondary School examinations have consistently highlighted weaknesses in students' ability to interpret social issues, analyze societal problems, communicate ideas effectively, and apply acquired knowledge to practical situations (NECO, 2022; NECO, 2023). These persistent challenges suggest the need for innovative instructional approaches capable of improving students' learning outcomes and attitude toward the subject.

One factor frequently associated with poor achievement and unfavourable attitude toward Social Studies is the continued use of conventional teaching methods that emphasize rote memorization and passive learning. In many classrooms, instruction is dominated by teacher-centred approaches in which students serve primarily as recipients of information rather than active participants in knowledge construction. Such approaches often fail to stimulate learners' curiosity, creativity, and critical thinking abilities (Arokoyu & Nwafor, 2018). According to Nyamwembe, Ondigi and Kiio (2020), students exposed predominantly to conventional instructional methods often demonstrate low motivation, limited engagement, and poor academic performance. Similarly, Ezeudu and Eze (2021) reported that teacher-centred instructional approaches contribute to students' negative perceptions of school subjects because they do not adequately address learners' individual differences and learning needs.

The growing emphasis on learner-centred pedagogy has led educational researchers to advocate instructional strategies that promote active participation, collaboration, critical thinking, and meaningful learning. Constructivist learning theorists argue that students learn more effectively when they actively participate in the learning process and relate new knowledge to their previous experiences (Schunk, 2020). Consequently, educational innovations that encourage students to explore, analyze, and organize information have become increasingly important in contemporary classroom practice. Among such innovations is the Conceptual Diagrams Technique (CDT).

Conceptual Diagrams Technique is a learner-centred instructional strategy that involves the use of visual representations such as concept maps, mind maps, flowcharts, spider maps, and Venn diagrams to organize and connect concepts in a meaningful manner. The technique helps learners visualize relationships among concepts, organize information systematically, and develop deeper understanding of subject matter (Akeju, Simpson, Rotimi, & Kenni, 2017). CDT enables students to integrate prior knowledge with new information, thereby facilitating meaningful learning and long-term retention. By presenting information graphically, conceptual diagrams simplify complex concepts and make abstract ideas more accessible to learners.

The effectiveness of conceptual diagrams is rooted in Ausubel's Theory of Meaningful Learning, which emphasizes the importance of linking new information to existing cognitive structures. According to the theory, learning becomes meaningful when learners are able to establish relationships between prior knowledge and newly acquired concepts (Ausubel, 1978). Conceptual diagrams support this process by providing visual structures through which students can organize and integrate knowledge. Consequently, learners become more actively involved in the learning process, resulting in improved understanding, retention, and application of knowledge. Empirical evidence suggests that conceptual diagrams positively influence students' achievement, retention, attitude, and interest across different subject areas. Akeju et al. (2017) found that conceptual diagrams significantly improved students' achievement, retention, and attitude in Physics. Agbeyenku (2017) reported that students taught Ecology concepts using conceptual diagrams achieved significantly higher and retained concepts better than those taught using conventional methods. Similarly, Leabhiele and Chukwu (2019) found that concept mapping instructional strategy significantly enhanced students' academic achievement in Economics. Misan-Ruppee and Akpochafo (2020) also reported that concept mapping improved upper basic students' performance in Social Studies. More recently, Ozomadu and Edeoga (2022) observed that students taught Mathematics using thinking maps performed significantly better than those taught using traditional instructional methods.

Apart from instructional strategies, school location has been identified as a factor that may influence students' attitude and academic achievement. School location refers to the geographical setting in which a school is situated, often categorized as urban or rural. Differences in school facilities, teacher quality, instructional resources, learning environment, and socio-economic conditions may contribute to variations in educational outcomes between urban and rural schools (Ajaja, 2019; Yusuf & Ahmed, 2022). While some studies have reported higher achievement among urban students, others have found no significant differences or even better performance among rural students. These inconsistent findings suggest the need for further investigation, particularly within the context of Social Studies instruction using Conceptual Diagrams Technique.

Gender is another variable that has received considerable attention in educational research. Researchers have examined whether male and female students respond differently to innovative instructional strategies and whether such differences influence academic achievement. Findings from previous studies remain inconclusive. For example, Agbeyenku (2017) reported that female students benefited more from conceptual diagrams than male students, whereas Leabhiele and Chukwu (2019) found no significant gender difference in students' achievement when concept mapping was used. Similar findings were reported by Onyejekwe, Uchendu, and Nmom (2020), who observed that conceptual diagrams improved students' achievement regardless of gender. These contradictory findings justify the need for additional studies to establish whether gender differences exist in Social Studies achievement when Conceptual Diagrams Technique is employed.

Although numerous studies have examined the effectiveness of conceptual diagrams in subjects such as Mathematics, Biology, Chemistry, Physics, and Economics, relatively few studies have focused on Social Studies, particularly in Biu Local Government Area of Borno State. Furthermore, limited empirical evidence exists regarding the influence of Conceptual Diagrams Technique on school location-based attitude and students' academic achievement in Social Studies within the study area. This gap in the literature necessitates further investigation. Therefore, this study examines the effects of Conceptual Diagrams Technique on school location-based attitude and academic achievement of Junior Secondary School students in Social Studies in Biu Local Government Area of Borno State, Nigeria.

Aim and Objectives of the Study

The aim of this study is to examines the effects of Conceptual Diagrams Technique on school location-based attitude and academic achievement of Junior Secondary School students in Social Studies in Biu Local Government Area of Borno State, Nigeria. The study sought to:

1. examine the attitude of junior secondary school students to Social Studies in urban and rural schools after exposure to Conceptual Diagrams Technique in Biu Local Government Area, Borno State.
2. determine the achievement of junior secondary school students in Social Studies before and after exposure to Conceptual Diagrams Technique in Biu Local Government Area, Borno State.
3. find out the achievement of male and female junior secondary school students in Social Studies after exposure to Conceptual Diagrams Technique in Biu Local Government Area, Borno State.

Research Questions

The following research questions guided the study:

1. What are the post-test attitude mean scores of junior secondary school students in urban and rural schools exposed to Conceptual Diagrams Technique in Social Studies?
2. What are the pre-test and post-test achievement mean scores of junior secondary school students in Social Studies exposed to Conceptual Diagrams Technique?
3. What are the post-test achievement mean scores of male and female junior secondary school students in Social Studies after exposure to Conceptual Diagrams Technique?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the post-test attitude mean scores of junior secondary school students in urban and rural schools exposed to Conceptual Diagrams Technique in Social Studies.
2. There is no significant difference between the pre-test and post-test achievement mean scores of junior secondary school students in Social Studies exposed to Conceptual Diagrams Technique.
3. There is no significant difference between the post-test achievement mean scores of male and female junior secondary school students in Social Studies after exposure to Conceptual Diagrams Technique.

Method and Procedure

This study adopted a quasi-experimental research design of the non-equivalent control group pre-test–post-test type. The design was considered appropriate because it enabled the researcher to compare the effects of Conceptual Diagrams Technique (CDT) on students' attitude and academic achievement in Social Studies without random assignment of participants to groups. Two groups were used: an experimental group exposed to CDT and a control group taught using the conventional talk-and-chalk method. Both groups were administered pre-tests and post-tests. The population of the study comprised 4,282 Junior Secondary School Two (JS II) students offering Social Studies in the 30 junior secondary schools in Biu Local Government Area of Borno State. The population consisted of 2,123 males and 2,159 females, with 1,826 students from urban schools and 2,456 from rural schools. A sample of 216 students drawn from four intact classes in four selected junior secondary schools participated in the study. The schools consisted of two urban and two rural schools. One urban and one rural school were assigned to the experimental group, while the remaining schools served as the control group.

Disproportionate stratified sampling and simple random sampling techniques were used in selecting the schools for the study. School location (urban and rural) served as the basis for stratification, while balloting was used to assign the selected schools to experimental and control groups. Data were collected using two researcher-developed instruments: the Students' Attitude to Social Studies Questionnaire (SASSQ) and the Social Studies Achievement Test (SSAT). The SASSQ consisted of 25 Likert-scale items designed to measure students' attitudes toward Social Studies, while the SSAT comprised objective and essay items developed from the Junior Secondary School Social Studies curriculum to assess students' academic achievement.

The instruments were validated by experts in Social Studies Education and Measurement and Evaluation to ensure content relevance, appropriateness, and coverage of the study objectives. Reliability of the SASSQ was established through internal consistency procedures, yielding a coefficient of 0.86, while the reliability of the SSAT was determined using the test–retest method and Pearson Product Moment Correlation. Prior to the commencement of the experiment, four research assistants were trained on the administration of the instruments and treatment procedures. Pre-tests were administered to both the experimental and control groups to determine their initial levels of attitude and achievement. Thereafter, the treatment lasted six weeks. Students in the experimental group were taught selected Social Studies topics using Conceptual Diagrams Technique, involving the use of concept maps, flowcharts, mind maps, and other visual organizers. The control group was taught the same topics using the conventional teaching method. At the end of the treatment period, the SASSQ and SSAT were re-administered as post-tests to both groups.

Data collected were analyzed using both descriptive and inferential statistics. Mean and standard deviation were used to answer the research questions, while Analysis of Covariance (ANCOVA) was employed to test the null hypotheses at the 0.05 level of significance. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

Result and Discussion

Research Question One

What is the post-test attitude mean scores of urban and rural school students in Social Studies in experimental group in Biu Local Government Area, Borno state?

Table 1: Attitude Mean Scores of Urban and Rural School students in Social Studies

Group	Location	Post-test			
		N	Mean	SD	$\bar{x}$- Difference
Experimental	Urban	47	99.60	13.720	4.32
	Rural	64	95.28	14.719	

Table 1 indicates the post-test attitude mean scores of students in urban and rural schools. Students from urban schools have a mean score of 99.60 with a standard deviation of 13.72. The students from the rural schools also have a mean score of 95.28 with a standard deviation of 14.72 with a mean difference of 4.32. This implies that the attitude mean score of urban and rural school students are almost same after teaching social studies using conceptual diagrams technique in Biu Local Government Area, Borno State with urban schools having a slightly higher mean score.

Hypothesis One

There is no significant difference between the post-test attitude mean scores of urban and rural schools JSII students in the experimental and control group in Biu LGA.

Table 2: ANCOVA Result on Attitude Mean Scores of Urban and Rural School Students in Social Studies in the Experimental and Control Groups.

Source	Type III Sum of Squares	Df	Mean Square	F	P-value
Corrected Model	2445.364[a]	2	1222.682	6.483	.002
Intercept	55189.112	1	55189.112	292.646	.000
Covariate	1940.918	1	1940.918	10.292	.002
School Location	471.766	1	471.766	2.502	.117
Error	20367.339	108	188.586		
Total	1069541.000	111			
Corrected Total	22812.703	110			

a. R Squared = .107 (Adjusted R Squared = .091)

Table 2 shows that the F-value for the school location (urban/rural) is 2.50 with significant P -value of .117 which is greater than .05 level of significance. The null hypothesis was therefore retained. The result further shows an adjusted R squared value of .091 which means that 9.1% of the variation in the dependent variable which is students' attitude is explained by variation in school location, while the remaining is due to treatment and other factors not included in this study. This means that conceptual diagrams technique has no effect on attitude of urban and rural school students in social studies. This implies that, there was no significant difference between the attitude mean scores of urban and rural school students taught Social Studies using conceptual diagrams technique.

Research Question Two

What is the pre-test and post-test achievement mean scores of JSII students in Social Studies in the experimental and control group in Biu Local Government Area, Borno State?

Table 3: Pre-test and Post-test Achievement Mean Score of Students towards Social Studies in the Experimental and Control Groups.

Group	Test	N	$\overline{X}$	SD	Mean Gain	Mean Gain Difference	Post-test Mean Difference
Experimental	Pre-test	111	28.93	9.76	34.93		
	Post-test	111	63.86	13.23		16.46	18.68
Control	Pre-test	105	26.71	8.79	18.47		
	Post-test	105	45.18	7.24			

Table 3 shows the pre-test and post-test achievement mean score of junior secondary II students towards social studies in the experimental and control group in Biu Local Government Area, Borno State. Students taught social studies using conceptual diagrams technique and those taught with lecture method had pre-test achievement mean scores of 28.93 and 26.71 with standard deviation scores of 9.76 and 8.79, respectively. The post-test mean scores of the experimental and control groups are 63.86 and 45.18, with standard deviation scores of 13.23 and 7.24, respectively. The mean gains were 34.93 and 18.47 for the two groups respectively with a mean gain difference of 16.46 and a post-test mean difference of 18.68. This implies that conceptual diagrams technique does help improve students' achievement in Social Studies.

Hypothesis Two

There is no significant difference between the post-test achievement mean scores of JSS II students in Social Studies in the experimental and control group in Biu Local Government Area, Borno state

Table 4: ANCOVA Result on Achievement 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 Eta Squared
Corrected Model	19032.117	2	9516.059	82.754	.000	.471
Intercept	57149.935	1	57149.935	496.992	.000	.777
Covariate	214.039	1	214.039	1.861	.174	.000
Group	18083.012	1	18083.012	157.255	.000	.467
Error	24493.216	213	114.992			
Total	691656.000	216				
Corrected Total	43525.333	215				

a. R Squared = .437 (Adjusted R Squared = .432)

Table 4 presents the Analysis of Covariance (ANCOVA) result on significant difference between the achievement mean scores of students in Social Studies in the experimental and control groups. From the result, F (213) = 157.26, P< 0.05, since the P-value of .000 is less than .05, the null hypothesis was therefore rejected, it was concluded that conceptual diagrams technique can help improve student's achievement in social studies. The result further shows an adjusted R squared value of .432, which means that 43.2% of the variation in the dependent variable which is students' achievement is explained by variation in treatment, while the remaining is due to other factors not included in this study. This implies that there is a significant difference in the post-test achievement mean scores of students in Social Studies in the experimental and control groups.

Research Question Three

What is the post-test achievement mean scores of male and female JSSII students in Social Studies in Biu Local Government Area, Borno state after exposure to conceptual diagrams instruction?

Table 5: Achievement Mean Scores of Male and Female Students in Social Studies after exposure to Conceptual Diagrams Technique.

Group	**Gender**	**Post-test**			
		N	**Mean**	**SD**	$\bar{x}$- Difference
Experimental	Male	61	61.57	13.85	5.07
	Female	50	66.64	11.98	

Table 5 shows the pre-test and post-test achievement mean score of junior secondary II students towards social studies in the experimental and control group in Biu Local Government Area, Borno State. Male and female students taught social studies using conceptual diagrams technique had mean scores of 61.57 and 66.64 with standard deviation scores of 13.85 and 11.98, respectively. The mean difference was 5.07. This implies that conceptual diagrams technique does help improve both male and female students' achievement in Social Studies in favour of female students.

Hypothesis Three

There is no significant difference between the post-test achievement mean scores of male and female JSS II students in Social Studies in the experimental group in Biu Local Government Area, Borno State.

Table 6: ANCOVA Result on Achievement Mean Scores of Male and Female Students in Social Studies in the Experimental Group.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	858.090[a]	2	429.045	2.519	.085	.015
Intercept	40333.396	1	40333.396	236.796	.000	.776
Covariate	152.834	1	152.834	.897	.346	.005
Gender	612.978	1	612.978	3.599	.060	.012
Error	18395.604	108	170.330			
Total	471864.000	111				
Corrected Total	19253.694	110				

a. R Squared = .045 (Adjusted R Squared = .027)

Analysis of Covariance (ANCOVA) was conducted to determine if there is a significant difference in the achievement mean scores of male and female students taught Social Studies using conceptual diagrams technique. Table 12 shows that the F-value for gender is 3.59 with significant P-value of .06 which is greater than .05 level of significance. The null hypothesis was therefore retained, it was concluded that there was no significant difference between the achievements mean scores of male and female students taught Social Studies using conceptual diagrams technique. The result further shows an adjusted R squared value of .027 which means that there is no significant effect of treatment on gender. Hence, conceptual diagrams technique can help improve the achievement of both male and female students in social studies.

Discussion of Findings

The findings of this study revealed that there was no significant difference in the attitude of urban and rural school students toward Social Studies after exposure to Conceptual Diagrams Technique (CDT). Although students in urban schools obtained a slightly higher mean attitude score than those in rural schools, the difference was not statistically significant. This finding suggests that CDT was equally effective in promoting positive attitudes toward Social Studies among students regardless of school location. The finding supports the assertion that Conceptual Diagrams Technique enhances students' engagement and participation by presenting concepts in visual and meaningful ways. As noted earlier, CDT enables learners to visualize relationships among concepts through mind maps, concept maps, flowcharts, and other diagrammatic representations, thereby making learning more interesting and learner-centred. The finding corroborates the view of Oduolowu (2023), who emphasized that Social Studies instruction requires strategies that actively involve learners in the teaching-learning process to develop responsible citizenship and meaningful understanding.

The findings further revealed a significant difference in the achievement mean scores of students taught Social Studies using Conceptual Diagrams Technique and those taught using the conventional lecture method. Students exposed to CDT recorded substantially higher post-test achievement scores and mean gains than their counterparts in the control group. This indicates that Conceptual Diagrams Technique significantly improved students' academic achievement in Social Studies. This finding validates the position presented in the introduction that conventional teacher-centred approaches often make learning abstract and less meaningful to students, whereas learner-centred instructional strategies such as CDT facilitate meaningful learning and improve achievement. The result is consistent with Ausubel's Theory of Meaningful Learning (Ausubel, 1978), which emphasizes that learning becomes more effective when new knowledge is meaningfully linked to learners' existing cognitive structures. The finding also supports the argument of Ezeudu and Eze (2021) that visual instructional strategies enhance learners' comprehension, retention, and academic performance.

The findings also revealed that there was no significant difference between the achievement mean scores of male and female students taught Social Studies using Conceptual Diagrams Technique. Although female students recorded a slightly higher mean achievement score than male students, the difference was not statistically significant. This implies that both male and female students benefited equally from the use of CDT. The finding supports the position that Conceptual Diagrams Technique provides equal learning opportunities for all learners by encouraging active participation, collaboration, and meaningful engagement with learning materials. The result is in line with the assertion in the introduction that CDT creates a learner-centred environment where students are actively involved in constructing knowledge. It also supports the view of Akinlaye and Bolarinwa (2021) that innovative instructional strategies can reduce achievement disparities among learners. The finding agrees with Misan-Ruppee and Akpochafo (2020) and Onyejekwe et al. (2020), who found no significant gender difference in students' achievement when concept mapping strategies were employed. However, the finding disagrees with Shaibu and Mari (2020), cited in the study, who reported significant differences in achievement between male and female students. The present result therefore suggests that Conceptual Diagrams Technique is gender-friendly and capable of enhancing achievement among both male and female students in Social Studies.

Conclusion

Based on the findings of this study, it was concluded that Conceptual Diagrams Technique (CDT) is an effective instructional strategy for improving junior secondary school students' learning outcomes in Social Studies. The study established that students taught Social Studies using CDT achieved significantly higher academic performance than those taught using the conventional lecture method. This demonstrates that the visual and learner-centred nature of CDT enhances students'

understanding of Social Studies concepts, promotes meaningful learning, and improves academic achievement. The study also concluded that school location did not significantly influence students' attitudes toward Social Studies after exposure to CDT. This implies that the technique is equally effective in fostering positive attitudes among students in both urban and rural schools. Furthermore, the study revealed that although female students recorded slightly higher achievement scores than male students, the difference was not statistically significant. Therefore, CDT can be considered a gender-friendly instructional strategy capable of benefiting both male and female learners equally.

Recommendations

Based on the findings and conclusions of this study, the following recommendations were made:

1. Social Studies teachers should adopt Conceptual Diagrams Technique in classroom instruction to enhance students' understanding of concepts and improve academic achievement in the subject.
2. Curriculum planners and educational authorities should incorporate Conceptual Diagrams Technique into Social Studies teaching guides and instructional materials to encourage learner-centred classroom practices.
3. School administrators should organize regular workshops, seminars, and in-service training programmes to equip teachers with the skills required for effective use of conceptual diagrams in classroom instruction.
4. Teachers in both urban and rural schools should be encouraged to use Conceptual Diagrams Technique, since the study found that its effectiveness is not significantly influenced by school location.
5. Conceptual Diagrams Technique should be used to teach both male and female students without discrimination, as the study revealed that the strategy benefits learners irrespective of gender.

References

1. Akeju, O. A., Simpson, A. A., Rotimi, C. O., & Kenni, A. M. (2017). *Effects of conceptual diagrams instructional strategy on students' learning achievement in physics in Nigerian secondary schools*. Journal of Science Education, 12(2), 45–57.
2. Ajaja, O. P. (2019). School location and students' academic achievement in secondary schools in Nigeria. *International Journal of Educational Research and Development, 8*(1), 23–31.
3. Agbeyenku, J. N. (2017). Effects of conceptual diagrams on performance and retention of ecology concepts among senior secondary school students in Kaduna State, Nigeria. *Journal of Science and Environmental Education, 5*(2), 67–79.
4. Akinlaye, F. A., & Bolarinwa, K. O. (2021). Innovative instructional strategies and students' academic achievement in Social Studies. *African Journal of Educational Studies, 14*(3), 101–114.
5. Arokoyu, A. A., & Nwafor, N. H. (2018). Social Studies education and citizenship development in Nigeria. *Nigerian Journal of Social Studies, 21*(1), 56–68.
6. Ausubel, D. P. (1978). *Educational psychology: A cognitive view* (2nd ed.). New York, NY: Holt, Rinehart and Winston.
7. Ezeudu, F. O., & Eze, I. R. (2021). Application of concept mapping strategy in enhancing students' learning outcomes. *Journal of Educational Theory and Practice, 10*(4), 88–99.
8. Leabhiele, N., & Chukwu, J. (2019). Impact of concept mapping instructional strategy on the academic achievement of senior secondary school economics students in Abia State. *International Journal of Educational Research, 7*(2), 34–46.
9. Mezieobi, K. A., & Mezieobi, D. I. (2019). *Social Studies in Nigeria: Teaching methods and contemporary issues*. Owerri, Nigeria: Acadapeak Publishers.
10. Misan-Ruppee, B., & Akpochafo, W. P. (2020). Concept mapping as an effective instructional strategy for improving upper basic students' performance in Social Studies in Delta State, Nigeria. *International Journal of Education and Evaluation, 6*(5), 12–24.
11. National Educational Research and Development Council (NERDC). (2017). *Basic education curriculum for junior secondary schools: Social Studies*. Abuja, Nigeria: NERDC Press.
12. National Examinations Council (NECO). (2022). *Chief examiners' report on Junior Secondary School Certificate Examination (JSSCE)*. Minna, Nigeria: Author.
13. National Examinations Council (NECO). (2023). *Chief examiners' report on Junior Secondary School Certificate Examination (JSSCE)*. Minna, Nigeria: Author.
14. Nyamwembe, B., Ondigi, S., & Kiio, M. (2020). Influence of instructional methods on students' academic achievement in Social Studies. *Journal of Educational Research and Practice, 11*(2), 77–89.
15. Oduolowu, E. A. (2023). Social Studies education and the development of global citizenship among learners. *Journal of Contemporary Educational Research, 15*(1), 41–55.
16. Onyejekwe, C. J., Uchendu, C. N., & Nmom, P. C. (2020). Effects of conceptual diagrams on students' performance in genetics among senior secondary school students in Rivers State, Nigeria. *International Journal of Science Education, 9*(3), 52–65.
17. Ozomadu, C. N., & Edeoga, G. N. (2022). Effect of thinking map instructional strategy on students' academic achievement in senior secondary school mathematics. *Journal of Mathematics Education Research, 13*(2), 91–104.
18. Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.). New York, NY: Pearson Education.
19. UNESCO. (2016). *Education 2030: Incheon declaration and framework for action for the implementation of Sustainable Development Goal 4*. Paris, France: UNESCO.
20. United Nations. (2023). *The sustainable development goals report 2023*. New York, NY: United Nations.
21. World Bank. (2020). *The COVID-19 pandemic: Shocks to education and policy responses*. Washington, DC: World Bank.
22. Yusuf, M., & Ahmed, S. (2022). Conceptual diagrams and students' academic achievement in junior secondary school Social Studies. *Journal of Educational Innovation and Research, 8*(4), 120–132.