



Comparative Effects of Visual Instructional Resources on the Learning Achievements of Social Studies Students

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Abstract

Background and Aim: Visual resources may make abstract Social Studies concepts more concrete, yet evidence comparing specific formats remains limited in Nigerian basic education. This study examined the effects of pictures, graphics, and flipcharts on Basic 9 students' Social Studies achievement in Delta State, Nigeria.

Materials and Methods: A quasi-experimental, post-test-only, non-equivalent-groups design was employed. Participants were 120 students from four intact classes in four public secondary schools in Delta South Senatorial District. Classes received instruction using pictures ($n = 33$), graphics ($n = 27$), flipcharts ($n = 35$), or conventional instruction (control; $n = 25$). The four-week intervention covered modes of transportation. Achievement was assessed using the 25-item Social Studies Learning Achievement Test, which had a test-retest reliability coefficient of .70. Post-test data were analyzed using descriptive statistics, one-way analysis of variance, and Tukey-Kramer pairwise comparisons.

Results: Mean scores were 66.48 ($SD = 9.66$) for pictures, 62.34 ($SD = 7.77$) for graphics, 61.61 ($SD = 7.55$) for flipcharts, and 46.25 ($SD = 5.64$) for the control. Differences were statistically significant, $F(3, 116) = 33.83$, $p < .001$, $\eta^2 = .467$. All visual-resource groups outperformed the control ($p < .001$). Pictures also outperformed graphics ($p = .026$) and flipcharts ($p = .003$), while graphics and flipcharts did not differ ($p = .957$).

Conclusion: Visual instructional resources were associated with improved Social Studies achievement, with pictures producing the strongest outcomes across the participating public secondary schools. Interpretation should remain cautious because intact classes, different teachers, a four-week intervention, and one post-test were used.

Keywords: Effects, Learning Achievements, Visual Instructional Resources, Pictures, Graphics, Flip Charts, and Social Studies

Introduction

Social Studies is designed to help learners understand people, institutions, environments, and the relationships that shape social life. Across educational systems, the subject therefore serves both cognitive and civic purposes by connecting classroom knowledge with social realities. Achieving these purposes requires instructional approaches that move beyond verbal explanation and provide learners with opportunities to connect abstract ideas with concrete representations. This concern is particularly relevant in Nigerian schools, where instructional delivery may still rely heavily on textbooks, teacher explanation, and the chalkboard despite the practical and interdisciplinary character of Social Studies.

Evidence from the Nigerian context suggests that inadequate or ineffective use of instructional resources remains an important classroom challenge. Owan et al. (2018) linked school-level instructional conditions with students' academic performance, while Edinyang et al. (2020) argued that Social Studies instruction should move beyond talk-and-chalk approaches to the purposeful use of instructional resources. Olokooba (2021) similarly emphasized the effective utilization of instructional materials in upper basic Social Studies. These concerns are important because Social Studies contains many concepts that can be more readily understood when learners are able to see, compare, classify, and interpret visual representations.

The educational value of visual resources can be explained theoretically through the Cognitive Theory of Multimedia Learning (CTML). Mayer (2021) argues that learners process information through interacting verbal and visual channels, each with limited capacity, and that meaningful learning occurs when learners select relevant information, organize it into coherent representations, and integrate those representations with prior knowledge. Although the present study uses static pictures, graphics, and flipcharts rather than digital multimedia, the underlying principle remains applicable: a well-designed visual representation can complement verbal explanation and provide an additional pathway for representing concepts. The cognitive-load theory also suggests that instructional materials should





be designed and presented in ways that avoid unnecessary processing demands (Sweller, 1988). Thus, the effectiveness of a visual resource depends not merely on its presence but on its relevance, clarity, organization, and integration with teacher explanation.

Within Social Studies, these theoretical principles are especially pertinent because the subject deals with people, places, environments, institutions, and processes that are often difficult to represent through verbal instruction alone. Pictures can provide concrete representations of people, places, and events; graphics can organize relationships and simplify complex information; and flipcharts can present a sequence of related visual representations in a form that is visible to an entire class. Atubi (2021), Emudianughe and Akporhuaro (2022), and Emudianughe et al. (2025) provide contextual evidence that instructional resources and visual representations can support learning in Social Studies. Despite previous research on the problem, an important gap remains. Much of the available literature discusses instructional resources generally or examines individual visual approaches in different subjects, locations, or learning outcomes. There is comparatively limited evidence that directly compares pictures, graphics, and flipcharts with a non-visual control condition among Basic 9 Social Studies students in Delta State. The present study therefore focuses on the extent to which these three forms of VIR are associated with differences in students' post-test learning achievement after a four-week instructional intervention on modes of transportation.

Objectives of the Study

The study was guided by the following research question and hypothesis:

RQ1: What difference exists in the post-test learning achievement of social studies students taught with pictures, graphics, flipcharts, and conventional instruction?

H01: There is no significant difference among the mean post-test learning-achievement scores of social studies students taught with pictures, graphics, flipcharts, and conventional instruction.

Literature review

A substantive review of literature carried out by the researcher showed the robust benefits that VIR can offer social studies learning.

Visual instructional resources

Visual instructional resources are materials that communicate instructional content through visual representation. They include pictures, charts, graphics, maps, real objects, photographs, and flipcharts. In Social Studies, such resources can help learners connect classroom concepts with observable social and environmental realities (Atubi, 2021; Edinyang et al., 2020). Rather than treating visuals as decorative additions to a lesson, the present study views them as representations that can support attention, organization, interpretation, and integration of information.

The CTML provides a useful explanation for this potential. Mayer (2021) describes learning as an active process in which learners select relevant information, organize it into verbal and visual models, and integrate those models with prior knowledge. The theory therefore predicts that appropriately designed visuals can support learning when they complement rather than overload the learner. Cognitive Load Theory similarly emphasizes the limited capacity of working memory and the importance of managing unnecessary cognitive demands (Sweller, 1988). In the present study, the implication is that pictures, graphics, and flipcharts may be useful when they are closely aligned with the lesson; for instance, the topic "modes of transportation" and are explained by the teacher in a structured manner.

Pictures

Pictures provide concrete visual representations of objects, people, places, and events (Syauki et al., 2021). In Social Studies, they can reduce the distance between an abstract description and the phenomenon being described. Edinyang et al. (2020) and Emudianughe (2025) emphasized the importance of visual instructional resources in Social Studies teaching, while Kristian et al. (2023) reported improved learning achievement with picture-supported instruction. Other studies have associated picture-based approaches with active and meaningful learning (Fansury & Januarty, 2018; Walangadi, 2019; Wahyudi et al., 2020).





Taken together, these studies suggest a consistent positive role for pictures, but they do not establish that pictures are equally effective across contexts. Some studies focus on language or general elementary learning, whereas the present study focuses on Social Studies achievement among Basic 9 learners. The contextual evidence from Delta State is therefore important. The present study extends the literature by placing picture-supported social studies instruction alongside graphics, flipcharts, and a control condition within the same study.

Graphics

Graphics organize information visually and can represent relationships, sequences, categories, or processes that may be difficult to explain verbally. Kennedy and Engebretsen (2020) discussed the role of graphics and maps in helping learners interpret information, while Parnafes (2007) demonstrated the value of graphical representations for understanding the physical world. Çifçi (2016) also reported positive effects of infographics on achievement and attitudes toward geography learning. Within the Nigerian social studies context, Emudianughe and Akporhuaro (2022) found evidence of a relationship between graphics and students' performance.

The literature therefore supports graphics as a potentially effective learning resource, but the studies differ in subject, learner population, and outcome measures. The present study contributes a direct comparison of graphics with pictures, flipcharts, and conventional instruction in Basic 9 social studies. This comparative approach is useful because it allows the relative performance of different visual forms to be considered rather than assuming that all visuals have identical effects.

Flipcharts

Flipcharts are sequential visual displays that allow information to be presented one segment at a time. They can be useful where a lesson involves a sequence of related representations, because the teacher can reveal and explain each chart progressively. Umar (2015) reported positive effects of flipchart instruction on social studies learning, while Aziz et al. (2020) found that flipchart-based cooperative learning could improve students' achievement. Bello (2012) also reported on flipcharts as an instructional resource in science learning.

Compared with the literature on pictures and graphics, empirical research on flipcharts in social studies appears less extensive. This makes flipcharts a useful component of the present comparative study. The purpose is not to assume that flipcharts are inherently superior, but to determine whether students exposed to flipcharts differ in post-test achievement from students receiving other visual treatments or conventional instruction.

Across the reviewed literature, pictures, graphics, and flipcharts are generally associated with improved engagement, visualization, comprehension, or achievement. However, the evidence is heterogeneous. Studies differ in educational level, subject, and location, type of visual resource, instructional duration, and outcome measure. Consequently, a positive finding for one visual resource in one context cannot automatically be generalized to another.

In this study, three gaps are particularly relevant. First, much of the literature examines visual resources separately rather than comparing several forms of VIR under comparable instructional conditions. Second, evidence specific to Basic 9 social studies students in Delta State is limited. Third, the literature often emphasizes general benefits of visual resources without clearly linking those benefits to a cognitive learning mechanism. The present study addresses these gaps by comparing pictures, graphics, flipcharts, and conventional instruction, grounding the rationale in CTML and cognitive-load principles, and focusing on post-test learning achievement of social studies learners in a defined Nigerian school context.

Methodology

Planning Stage

A lesson plan was developed around the topic "Modes of Transportation." Pictures, graphics, and flipcharts relating to road, railway, water, and air transportation were prepared for use during instruction. The same lesson content and instructional objectives were used across the four groups. The visual resources were selected because they were accessible, could be prepared in a consistent format, and were directly relevant to the lesson topic.





Ethical Procedure

Ethical principles were observed throughout the conduct of the study. Permission to conduct the study was obtained from the heads of the four participating schools. Consent was also sought from the participating teachers, students, and their parents. Participation was voluntary, and participants were informed about the purpose and procedures of the research before data collection. Participants' privacy and confidentiality were respected, and the information obtained from respondents was used solely for research purposes. The counselling intervention was delivered by the researcher in accordance with the planned programme, while participants in the control group did not receive the intervention during the study period. Personal information collected through the SSLAT was treated confidentially, and participants were not identified by name in the reporting of the findings. The study involved normal classroom instruction and a post-test based on the topic taught. The participating teachers were qualified social studies teachers with teaching experience.

Research Design, Population and Sampling Procedure

The study employed a quasi-experimental post-test-only, non-equivalent-groups design. Intact classes were used; the students were not individually randomized to treatment conditions, and no pre-test was administered. Four public schools were selected by balloting from Delta South Senatorial District. One intact Basic 9 class was selected in each participating school, and all students in the selected classes were included. Thus, the sampling unit at the final stage was the intact class rather than the individual student.

The population comprises 13,231 Basic 9 students. The four intact classes produced a total sample of 120 students aged 12–14 years: 33 students in the pictures group, 27 in the graphics group, 35 in the flipcharts group, and 25 in the control group. Because the four classes were intact and the study did not report random assignment of classes to conditions, the groups should be regarded as non-equivalent at baseline.

Table 1. Sample Distribution by Study Group

School	N	Condition	Class status
Dom Domigos Secondary School	33	Pictures	Intact class
Essi College, Warri	27	Graphics	Intact class
Uwangu College, Warri	35	Flipcharts	Intact class
College of Commerce, Warri	25	Control	Intact class
Total	120		

Instrument of Data Collection

Data were collected with the 25-item Social Studies Learning Achievement Test (SSLAT), developed from the topic “Modes of Transportation.” Each item had four response options, with one correct answer. A correct response attracted four marks. The items were reviewed by an expert in Measurement and Evaluation at Delta State University, Abraka, and a senior academic colleague for content relevance, clarity, and alignment with the lesson objectives.

Reliability was established using the test–retest method. Twenty copies of the SSLAT were administered twice to students in a school outside the study area, with a two-week interval between administrations. Pearson Product Moment Correlation produced a coefficient of $r = .70$. Test–retest reliability was appropriate here because the purpose was to estimate the temporal stability of scores on an objectively scored achievement test before the intervention. The SSLAT was structured around three cognitive levels-remembering, understanding, and thinking in a 1:2:1 distribution. Accordingly, 25% of the items assessed remembering, 50% assessed understanding, and 25% assessed thinking.

Intervention and Data Collection Procedure

Four Social Studies teachers, one in each participating class, assisted with implementation. The researcher provided the lesson plans and visual resources. The pictures, graphics, and flipcharts group received instruction using their designated visual resource, while the control group received the same lesson content without the study-specific visual resources. Teachers presented and explained the





materials in relation to the different modes of transportation, and students were given opportunities to observe and study the visual representations.

The intervention lasted four weeks. At the end of the fourth week, the SSLAT was administered to all four groups as a post-test. To reduce variation in implementation, the same topic, lesson objectives, duration, test instrument, and researcher-prepared visual materials were used across groups. However, because a different teacher taught each intact class, potential threats to internal validity cannot be ruled out completely and are treated as a limitation of the study.

Data Analysis

Mean and standard deviation were used to summarize post-test achievement. Because the study collected only post-test scores and had no pre-test covariate, analysis of covariance (ANCOVA) was not appropriate. A one-way analysis of variance (ANOVA) was therefore used to test whether the four group means differed significantly. Where the omnibus ANOVA was significant, Tukey–Kramer pairwise comparisons were used to identify which groups differed. Statistical decisions were made at the .05 significance level. The analysis did not test an interaction effect because the four conditions were separate groups rather than factors in a factorial design.

Results

Research Question: What difference exists in the post-test learning achievement of students taught with pictures, graphics, flipcharts, and conventional instruction?

Table 2. Mean and Standard Deviation of Post-test Achievement Scores

Group	N	Mean	SD
Pictures	33	66.48	9.66
Graphics	27	62.34	7.77
Flipcharts	35	61.61	7.55
Control	25	46.25	5.64
Total	120	59.91	9.80

The pictures group recorded the highest post-test mean ($M = 66.48$, $SD = 9.66$), followed by the graphics group ($M = 62.34$, $SD = 7.77$) and the flipcharts group ($M = 61.61$, $SD = 7.55$). The control group recorded the lowest mean ($M = 46.25$, $SD = 5.64$). The mean differences between each visual group and the control group were 20.23 points for pictures, 16.09 points for graphics, and 15.36 points for flipcharts.

H01: There is no significant difference among the mean post-test learning-achievement scores of Social Studies students taught with pictures, graphics, flipcharts, and conventional instruction.

Table 3. One-way ANOVA of Post-test Achievement Scores

Source	SS	Df	MS	F	p
Between groups	6349.91	3	2116.64	33.83	< .001
Within groups	7257.31	116	62.56		
Total	13607.22	119			

The one-way ANOVA showed a statistically significant difference in post-test achievement among the four groups, $F(3, 116) = 33.83$, $p < .001$, $\eta^2 = .467$. Thus, the null hypothesis was rejected. The effect size indicates that approximately 46.7% of the variance in the reported post-test scores was associated with differences among the four instructional conditions in this sample.

Table 4. Tukey–Kramer Pairwise Comparisons

Comparison	Mean difference	P	Decision
Pictures vs. Graphics	4.14	.026	Significant
Pictures vs. Flipcharts	4.87	.003	Significant





Comparison	Mean difference	P	Decision
Pictures vs. Control	20.23	< .001	Significant
Graphics vs. Flipcharts	0.73	.957	Not significant
Graphics vs. Control	16.09	< .001	Significant
Flipcharts vs. Control	15.36	< .001	Significant

The pairwise comparisons show that all three visual-resource groups outperformed the control group. Pictures also produced higher scores than graphics and flipcharts, whereas the graphics and flipcharts groups did not differ significantly. These results provide more precise evidence than separate treatment-versus-control ANCOVA tables and are consistent with the post-test-only design.

Discussion

The study found a statistically significant difference in Social Studies post-test achievement across the pictures, graphics, flipcharts, and control groups. The mean scores indicate a clear descriptive advantage for the three visual-resource groups over conventional instruction. The one-way ANOVA, $F(3, 116) = 33.83$, $p < .001$, $\eta^2 = .467$, further indicates that the differences among the groups were substantial in this sample. The pictures group recorded the highest mean score. This finding is consistent with literature suggesting that pictures can make learning more concrete, meaningful, and engaging (Fansury & Januarty, 2018; Kristian et al., 2023; Walangadi, 2019; Wahyudi et al., 2020). From the perspective of CTML, pictures can provide a visual representation that learners can organize and connect with verbal explanations and prior knowledge (Mayer, 2021). However, the present result should not be interpreted as proof that pictures are universally superior because the comparison was conducted within one topic, one educational level, and a four-week intervention.

Graphics also produced significantly higher achievement than the control condition. This result agrees with evidence that graphical representations can support interpretation, visualization, and understanding of complex information (Kennedy & Engebretsen, 2020; Parnafes, 2007; Çifçi, 2016). The present study adds contextual evidence from Basic 9 Social Studies students in Delta State. However, graphics did not differ significantly from flipcharts, suggesting that the presence of a clear visual representation may be more important than the particular static format when the instructional content is appropriately matched.

Flipcharts likewise produced significantly higher achievement than conventional instruction. This finding is consistent with Umar (2015) and Aziz et al. (2020), who reported positive learning outcomes associated with flipchart-supported instruction. The sequential nature of flipcharts may help teachers organize information progressively and allow students to focus on one representation at a time. Nevertheless, the evidence should be viewed as context-specific because the present study used only one topic and one four-week intervention.

Knowledge Contribution

Overall, the findings support the proposition that appropriately selected visual resources can strengthen Social Studies learning achievement. The results also support the theoretical argument that visual representations can complement verbal explanation and assist learners in organizing instructional information. At the same time, the non-equivalent intact-group design means that differences among schools, teachers, or students may partly contribute to the observed group differences. The findings therefore support an association between the instructional conditions and post-test achievement rather than an unconditional causal claim.

Limitations

First, the sample was relatively small and was drawn from only four intact classes in four public schools in one senatorial district. Generalization to all Basic 9 Social Studies students in Delta State or Nigeria should therefore be made cautiously.





Second, the study lasted only four weeks. A short intervention may capture immediate achievement differences but cannot establish whether the benefits of visual resources persist over longer periods.

Third, the study relied on a single cognitive achievement test administered after the intervention. Although the SSLAT had expert validation and a test-retest reliability coefficient of .70, a single post-test does not provide evidence about long-term retention, motivation, engagement, or transfer of learning. Future studies should consider delayed post-tests and complementary measures such as classroom observation and learner engagement.

Fourth, the use of four different teachers introduces a possible teacher effect. Differences in teacher experience, instructional style, classroom management, or familiarity with visual resources could have influenced student achievement. The study attempted to reduce this threat by using the same topic, lesson objectives, intervention duration, and researcher-prepared materials, but teacher variation could not be eliminated.

Finally, because intact classes were used and students were not randomly assigned to conditions, pre-existing differences among the groups cannot be excluded. Future research should use larger samples, random assignment where feasible, pre-test and post-test measures, multiple schools per condition, and preferably the same teacher or a carefully standardized teaching protocol across groups.

Conclusion

The study concludes that the use of visual instructional resources was associated with higher post-test learning achievement in Basic 9 Social Studies than conventional instruction in the participating schools. Students taught with pictures, graphics, and flipcharts recorded mean scores of 66.48, 62.34, and 61.61, respectively, compared with 46.25 for the control group. The overall difference was statistically significant, $F(3, 116) = 33.83$, $p < .001$, with a large η^2 of .467. Pictures produced the highest mean and outperformed both graphics and flipcharts in the pairwise analysis, while graphics and flipcharts did not differ significantly.

These findings respond directly to the educational problem identified in the introduction: the continued reliance on predominantly verbal approaches despite the visual and contextual nature of much Social Studies content. The evidence suggests that teachers can make lessons more concrete and accessible by deliberately integrating relevant visual representations into instruction. For policymakers and school administrators, the implication is that provision of instructional resources should be accompanied by teacher professional development on how to select, design, and integrate visuals with lesson objectives.

Schools should also support low-cost, locally produced visual materials so that effective visual instruction is not dependent solely on expensive digital technologies. The conclusion should nevertheless be interpreted within the study's methodological boundaries. The results demonstrate differences in post-test achievement under the observed conditions, but the non-randomized, intact-class design, four-week duration, teacher variation, and single cognitive outcome limit the strength of causal and generalization claims.

Practical Implications

For teachers, visual resources should be selected for instructional relevance rather than simply for attractiveness. Pictures should represent the exact concepts being taught; graphics should simplify relationships or processes; and flipcharts should sequence related information logically. Teachers should combine visuals with questioning, explanation, comparison, and learner participation.

For school administrators and education authorities, instructional-resource provision should include both physical materials and professional development. Workshops can focus on designing low-cost visual aids from locally available materials, evaluating visual clarity and accuracy, and integrating visuals into lesson plans. Monitoring and support should also emphasize actual classroom use rather than the mere availability of resources.

For researchers, future studies should compare visual resources across multiple topics and grade levels, use larger and more diverse samples, incorporate pre-test and delayed post-test measures, and





examine whether factors such as gender, prior achievement, school location, teacher characteristics, and socioeconomic background moderate the relationship between visual instruction and achievement.

AI Use Disclosure

The authors declare that ChatGPT (OpenAI) was used to assist with language editing, grammatical refinement, and improvement of clarity and readability. The authors reviewed and verified all AI-assisted content and take full responsibility for the accuracy, originality, and integrity of the final manuscript.

Conflict of Interest

The authors reported no conflict of interest.

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<https://repo.ijert.org/index.php/ijert/article/view/2333>



APPENDIX



Pictures of Road Transportation Mode



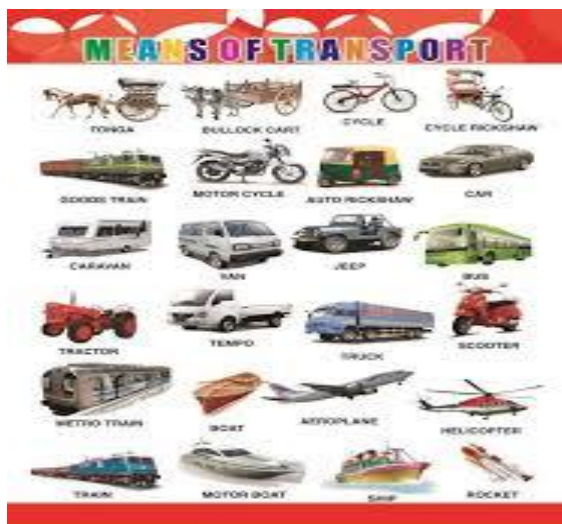
Pictures of Railway Transportation Mode



Pictures of Water Transportation Mode



Pictures of Air Transportation Mode



Graphics Charts Showing Different Transportation Modes



Graphics Charts Showing Different Transportation Modes



Flip Charts Showing Different Transportation Modes

Sources

Nigeria Transport Pictures, Images, and Stock. www.istockphoto.com

Flip charts picture

<https://www.google.com/search?q=flip+chart+pictures&oeq=flip+chart+pictures+&aqs=chrome..69i57j0i22i30l9j0i15i22i30.12572j0j9&client=ms-android-transsion&sourceid=chrome-mobile&ie=UTF-8#vhid=vKTBLBJTTgkg0M&vssid=l>

<https://www.google.com/search?q=pictures+of+transportation+modes+in+Nigeria&oeq=pictures+of+transportation+modes+in+Nigeria+&aqs=chrome..69i57j33i160l4j33i67l.25803j0j1&client=ms-android-transsion&sourceid=chrome-mobile&ie=UTF-8>

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