Journal of Research in Education and Society, Volume 13, Number 3, December 2022
ISSN(p): 2141-6753 ISSN(e): 2795-3033
Published By
International Centre for Integrated Development Research, Nigeria
In collaboration with
Copperstone University, Luanshya, Zambia

The Use of Graphics and Social Studies Students' Performance in Upper Basic Schools in Delta Central Senatorial District

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ABSTRACT

The study examined the relationship between the use of graphics in teaching Social Studies and Students' academic performance in Upper Basic Schools in Delta Central Senatorial District. Three research hypotheses were formulated for the study. This research is a correlational survey. The population comprised all Upper Basic Schools Students in Delta Central Senatorial District. There are 13,394 students in 188 public secondary schools in Delta Central Senatorial District in the eight (8) Local Government Areas. The sample for this study was 1000 students from 20 Upper Basic schools selected from 8 Local Government Areas. The sampling procedure used was the simple random technique. The instrument used for the study was a Social Studies Achievement Test (SSAT). Pearson Product Moment Correlation Statistics was used in testing the hypotheses at a 0.05 level of significance. The findings revealed the use of graphics materials' effectiveness in improving students' achievements in Social Studies and reducing cognitive abstraction inherent in some Social Studies concepts. It recommended Delta State Ministry of Education organize seminars and workshops for teachers to integrate graphic materials in teaching Social Studies.

***Keywords**: Graphics, Upper Basic Schools, Academic Performance*

INTRODUCTION

Despite recent advancements in communication technology, learning at the Upper Basic School level has been highly dependent on time and place and is often teacher-oriented. One way to bring a change or emphasis in teaching from the teacher-directed approach to a facilitated one is to change the medium of instruction (Kearsley, 2012). Graphics material offers an alternative medium of instruction delivery to the current learning process. The nature of interactivity and discovery in graphics learning boosts the monotony of passive learning (Mayer and Moreno, 2013). Graphic materials are multimedia elements like coloured images, text, audio or video sequences, and animations (Smiciklas, 2012). Graphics materials can be relevant in teaching various school subjects. It involves two or more different types of instructional media in a presentation (Taner, 2016). Mayer and Moreno (2013) noted that an instructional delivery involving the use of VCD/DVD or Powerpoint or 16mm film, for example, is a graphic presentation, in that still pictures, text, graphics, motion picture,

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background sound and some narrations are synchronized or combined at the same time to enhance learners understanding of concepts. Maurice (2018) noted that timekeeping and coordination of different media are involved in this approach. It also includes interactive elements such as graphics, text, video, sound, and animation to deliver lessons (Nkweke, 2010). The teacher uses different techniques, methods, and media to facilitate learning in the classroom. According to Efebo (2016), when classroom instruction deliveries are with examples, questions, demonstrations, and graphics materials, teaching becomes more appropriate. Most graphical material practitioners reflect a cognitive-perceptual philosophy (Bartsch, 2019). They have emphasized the values of synchronizing graphical into the learning process to involve several senses of the learner and combating "verbalism" in the classroom (Aggarwal, 2017).

Graphic materials, according to Parnafes (2017), can give low-ability students learning time before moving forward. This aspect of multimedia learning supports a student-centred strategy whereby learners take responsibility for their learning process (Owolabi & Ogini, 2014). The liberty to proceed or recede allows self-pacing (Staylor, 2012). It is an important facet that enables learners to learn according to their pace and will ensure that students may perceive information equally (Kellerman, 2014). Thus, graphics materials may boost abstract subjects that require higher cognitive processing. Graphics materials were used in the form of projected multimedia instructional presentations. Students presented animated text that had background narration of the text displayed on the projection screen or paper with well-labeled descriptions. On the screen were exercising the lesson objectives to immediately evaluate the learning as the lesson proceeded and feedback to project from a selected list of examples to help the students fully comprehend the mathematical concept.

Social Studies curriculum over the years has been delivered mechanically or by rote learning, which makes instruction teacher-centered (Thomas, 2018). Hardly can vital abstract contents in Social Studies be effectively communicated to the learners theoretically. There is a need for relevant graphical materials that reduce abstraction and bring learning from the imaginary world to the real world. The teaching method is also a source of poor academic performance (Oghene, 2020). Most teachers still prefer the “chalk and talk” method in instructing learners.

Graphical materials could facilitate meaningful learning of Social Studies; this method is a good strategy for improving cognition (Hoska, 2019). A good deal of expected learning outcomes is not realized in Social Studies in the Upper Basic schools due to the non-availability of instructional materials and lack of effective utilization of appropriate teaching materials (Nwagbo, 2018). There is a need to find if graphical materials will affect the academic achievement of Social Studies students. According to Onyegegbu (2016), graphics materials are relevant in their use to facilitate learning to achieve a specified and replicable learning outcome in enhancing participatory learning when the learners are directly involved in classroom interaction.

Tatli and Ayas (2013) studied the effect of a Virtual Chemistry Laboratory (VLC) on students' achievement and observed a significant difference between the groups in the post-test at the end of the study. Scheffe’s posthoc test further revealed that the direction of

difference in favour of the experimental group suggests that the graphic materials in the Virtual Chemistry Laboratory were as effective as the conventional chemistry laboratory.

Adegoke (2011) investigated the effect of multimedia instruction on senior secondary school students' achievement in physics. The results showed that students in the animation + on-screen text + narration group took the best quality notes. It seemed to have influenced their superior cognitive achievement in physics. Generally, students under multimedia instruction performed better than their colleagues in the lecture group; it suggested that multimedia instruction can enhance learning. Rotimi, Ajogbeje and Akeju (2012) conducted a study on a new kind of Visual-model instructional strategy in Physics. They revealed a positive effect of treatment on learning achievement in physics. Yuen-Kuang and Yu-wen (2017) studied the effect of computer simulation (multimedia) on students learning. They reported that Computer Simulation Instruction has moderately positive effects on students' achievement.

The application of graphics to present learning content to students in Nigerian primary and secondary schools has been a challenging task for most teachers. Problems associated with the utilization of graphic instructional resources could stem from different aspects – ranging from teachers' attitudes to work and dispositions of school management to the use of instructional media and a multitude of other factors. It could also be a lack of qualified teachers, inadequate training of teachers, poor use of graphics materials, inadequate graphics instructional materials in teaching Social Studies, and outdated or conventional teaching methods. The effect of the problems enumerated above is manifested in producing high waste in form of students losing interest in taking Social Studies as a disciple. Therefore, educational professionals could use graphics materials to solve some of these problems.

Hypotheses

The following null hypotheses were formulated to guide the study:

1. There is no significant relationship between the use of graphics and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District.
2. There is no significant relationship between the available graphics of urban/rural location and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District.
3. There is no significant relationship between the level of use of graphics and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District.

Theoretical Framework

The theoretical framework of this study is hinged on the Symbol Systems Theory propounded by Gavriel Salomon in 1977; the theory states that media affect the acquisition of information in many ways. They help learners easily decode information, process knowledge, and elaborate meanings (Salomon, 1979). According to Salomon, every medium can transmit

knowledge through a System of symbols. The theory suggests that television needs lesser mental coding than reading a book. However, the knowledge extracted by a learner depends on the learners' inherent ability and the media resources acting as a boost to the learning process. Gavriel Salomon, an educational psychologist spent time inquiring about the effects of media on learning.

Graphics is derived from the Greek word "*Graphikos"* meaning something written. The basic idea behind the graph is the intention of writing concerning all forms of written and drawn elements as writing. It could be described as visual images or designs on some surface, such as a wall, screen, paper, or stone to inform, illustrate, or entertain. In contemporary usage, graphics include a pictorial representation of data, as in computer-aided design and manufacture, typesetting, and educational and recreational software (Clark, 2010). Mayer (2018) defined graphics as the iconic expressions of content designed to optimize learning and performance in ways that improve the bottom-line performance of an organization. This definition incorporates three ideas - Iconic, which refers to pictorial representations of content. The surface features of such visuals may be static or dynamic and may have high or low degrees of correspondence to real things. Thus, a photograph is a highly realistic representation that is static. The second idea is designed to optimize learning and performance and refers to the purpose of the visual. The focus here is on graphics that intend to support learning or improve performance in the workplace, such as text pages and online screens, work aids such as job cards, and Web screens designed to help workers complete job tasks more effectively. Thirdly, „bottom-line performance;" means visuals that improve learning or performance in ways that pay off in improved organizational results. Abimbade (2019) describes graphics as two-dimensional materials in that they have surfaces that are flat with an area (length and breadth). A well-designed graphics may provide the needed structure that allows learners to effectively select, organize, and integrate new information (Mayer, 2018).

Relationship between the Use of Graphics and Students' Academic Performance

Graphics as an instructional resource has been a research issue. Various studies dealing with the effects of pictures and other graphics on learning by a chain of educationists throw more light on the phenomenon. Hawk (2016) involved above-average students in sixth and seventh-grade life science classes and examined the effectiveness of graphics as an advanced organizer on students' achievement. A total of 455 students from 15 classes were in one of two groups: one group received graphic organizers at the beginning of a chapter, and the other group did not receive graphic organizers. Each participating student in the study scored above the 60th percentile on a standardized achievement test.

The treatment variable was the graphic organizers throughout the first seven chapters of instructional deliveries in the life science class. The control students did not have graphic organizers during the instruction of the first seven chapters. The Life Science text was used in all 15 classes. Identical pretests and posttests containing 50 items were used for evaluation. Students in classes that used graphics organizers scored significantly higher on posttests than students in the control group.

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One of the most prolific instructional visual research to date has been the study by Dwyer (2017). He researched with more than 8,000 high school students and 40,000 college students. The study investigated the effects of representational pictures varying from highly detailed color photos to simple line drawings as an aid to learning the content contained in the script. Also studied were the effects of various lesson strategies on visualized instructions, such as using moving arrows and inserted questions as cueing strategies. The unique aspect of Dwyer's research is its systematic approach to investigating the use of visuals in instruction. The instructional materials of every study involved a 2,000-word script describing the parts, locations, and functions of the human heart. True to instructional design principles, instructional visuals were only added to illustrate the scripts to learners. A total of 37 critical areas were augmented with visuals (Rieber, 2020).

METHOD

This study is a correlational survey adopting the ex-post-facto research design. The survey attempts to collect data from members of a defined population to determine the current status of the condition of that population. It aims at having a general assessment of people about a particular problem. The population for this study comprised all public secondary school principals and teachers in Delta Central Senatorial District. There are 188 public secondary schools in Delta Central Senatorial District and 13,394 students in the eight (8) Local Government Areas.

Table 1: Population Distribution of Upper Basic Schools and Teachers in Delta Central Senatorial District

S/N	Senatorial District	L.G.A	No. of Schools	No. of Students
1.	Delta Central	Ethiope East	24	1,535
2.		Ethiope West	24	1,487
3.		Okpe	17	1,027
4.		Sapele	16	2,627
5.		Udu	14	1,468
6.		Ughelli North	47	1,592
7.		Ughelli South	30	1,236
8.		Uvwie	16	2,422
Total			**188**	**13,394**

Source: Ministry of Basic and Secondary Education Headquarters, Asaba (2021).

The sample for this study was 20 Upper Basic schools and 1000 students in Upper Basic schools in Delta Central Senatorial District selected from 8 Local Government Areas. It represented 10% of the population. It was to enable the effective administration of the instrument. The sampling procedure used was the simple random technique. The choice of the simple random sampling technique is because it gave all the schools an equal chance of being selected. The stratified random sampling technique was used to group the students

based on gender and location. It enabled the researcher to compare the students' achievements based on gender and school location using the Social Studies Achievement Test.

Table 2: Sample Distribution of Schools and Teachers

S/N	Senatorial District	L.G.A	No. of Schools	No. of Students
1.	Delta Central	Ethiope East	4	200
2.		Udu	4	200
3.		Ughelli North	4	200
4.		Ughelli South	4	200
5.		Uvwie	4	200
Sub Total			**20**	**1,000**

Source: Field

RESULTS AND DISCUSSION

Table 3: Socio-Demographic Characteristics of respondents

Variables	Category	Frequency	%
Sex of Respondents	Male	477	47.7%
	Female	523	52.3%
	Total	**1000**	**100%**
Location	Urban	688	68.8%
	Rural	312	31.2%
	Total	**1000**	**100%**
Class	JS1	428	42.8%
	JS2	361	36.1%
	JS3	211	21.1%
	Total	**1000**	**100%**

Source: Field, 2022

Table 4: Mean achievement scores of students taught using graphic materials and those taught without graphic materials

Variables	N	No of Items	Σpq	Mean	SD	Rf
Graphic Materials	520	10	20.95	24.09	11.06	0.96
Without Graphic materials	480			19.90	10.18	

Table 4 shows the Social Studies Achievement Test (SSAT) reliability using the Kuder-Richardson formula 20. This approach became necessary because the SSAT is a single multiple-choice objective test with an expected response of either pass (1) or fail (0), thus, a

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reliability estimate of 0.96 to establish the internal consistency of the SSAT. The result revealed that students taught with graphics materials perform better academically than those taught without graphic materials. Using graphics materials has high reliability and should be used. Since the SSAT has 10 items, the high reliability seems to explain that the longer a test, the higher the reliability coefficient.

Table 5: Mean achievement scores of students taught using available graphic materials in urban and rural location

Variables	N	No of Items	Σpq	Mean	SD	Rf
Urban	688	10	20.95	56.70	18.04	0.91
Rural	312			53.70	21.23	

Table 5 shows an estimate of the Social Studies Achievement Test (SSAT) reliability using the Kuder-Richardson formula 20, thus, a reliability estimate of 0.91 to establish the internal consistency of the SSAT. The result revealed that students taught with graphics materials in urban areas perform better academically than those in rural locations.

Table 6: Mean achievement scores of students on the level of the use of graphics from JS1, JS2 and JS3

Variable	N	No of Items	Σpq	Mean	SD	Rf
JS1	428	10	20.95	46.70	21.04	0.92
JS2	361			31.70	18.23	
JS3	211			19.76	10.34	

Table 6 shows the Social Studies Achievement Test (SSAT) reliability using the Kuder-Richardson formula 20, thus, a reliability estimate of 0.92. It helped to establish the internal consistency of the SSAT.

Table 7: Pearson's *r* on relationship between use of graphics and Social Studies students' academic performance

Variables	Mean	SD	N	DF	R	P	Significance
Use of graphics	8.32	2.22	1000	098	.103	1.07	0.05
Social Studies Students' academic performance	5.75	4.23					

Table 7 shows a calculated r-value of .103 and a P-value of 1.07. The P value is greater than the r value testing at a significant level of 0.05. Therefore, the null hypothesis that there is no relationship between the use of graphics and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District is accepted and retained. It implies that graphics is significant to Social Studies students' academic performance.

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Table 8: Pearson's *r* on relationship between available graphics urban/rural location and Social Studies students' academic performance

Variables	Mean	SD	N	DF	R	P	Significance
Available graphics in urban and rural	6.57	1.63	1000	098	.023	0.54	0.05
Students' academic performance	3.45	1.64					

Table 8 showed a calculated r-value of .023 and a P-value of 0.54. The P-value is greater than the r-value, testing at a significant level of 0.05. The null hypothesis that there is no relationship between the available graphics of urban/rural location and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District is accepted and retained. Hence, there is a relationship between available graphics in urban and rural schools and students' academic performance.

Table 9: Pearson's *r* on Relationship between level of use of graphics and Social Studies students' academic performance

Variables	Mean	SD	N	DF	R	P	Significance
Level of use of graphics	5.50	2.30	1000	098	.037	0.47	0.05
Students' academic performance	8.14	1.63					

Table 9 showed a calculated r-value of .037 and a P-value of 0.47 testing at a significant level of 0.05; the P-value is greater than the r-value. Therefore, the null hypothesis that there is no relationship between the level of use of graphics and Social Studies students' academic performance in Upper Basic schools in Delta Central Senatorial District is accepted and retained. It indicates a relationship between the use of graphics and Social Studies students' academic performance.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the use of graphics materials is effective for improving students' achievement in Social Studies and reducing cognitive abstraction inherent in Social Studies concepts. The study also established the use of graphics materials to harness teaching and learning. Based on the findings, the following are recommended:

1. The Delta State Ministry of Education should organize seminars and workshops for teachers to integrate graphics materials in teaching Social Studies.

2. School heads should provide graphic materials for their schools to ensure the availability of instructional materials.

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