

IMPACT OF INFOGRAPHICS ON THE ACADEMIC PERFORMANCE OF JUNIOR SECONDARY SCHOOL SOCIAL STUDIES STUDENTS IN GIWA EDUCATIONAL DIVISION, KADUNA STATE, NIGERIA

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Abstract

The study investigated the impact of infographics on the academic performance of junior secondary school (JSS) social studies students in Giwa Educational Division, Kaduna State, Nigeria. The study was carried out with three objectives to; determine the performance of students taught social studies using infographics and those taught with conventional teaching method. It also determined the influence of infographics on the performance of male and female social studies students and assessed the performance of JSS students taught social studies using infographics in rural and urban schools in Giwa Educational Division Kaduna State. The study adopted a quasi-experimental design with the total population of 8,831. The sample size of the study is 175. One hundred and nine students were assigned into experimental groups and 66 were in the control group. Data for the study was collected through Social Studies Achievement Test (SSAT). SSAT consists of 50 multiple choice objective test items with four options (A-D). Data collected were analyzed statistically using descriptive statistics of mean and standard deviation to answer the research questions. Inferential statistics of ANCOVA was used to test the three hypotheses. The findings of the study revealed that there was no significant difference in the performance of JSS students taught social studies using infographics and those taught with lecture method, there was no significant difference in the performance of male and female students taught social studies using infographics at JSS in Giwa (Education) Division Kaduna State. However, students in Urban area performed better than those in Rural area when exposed to infographics instructional package. Based on the findings, it was recommended that, relevant infographics instructional package that bridge the gap between male and female should be used for teaching in schools.

Keywords: Infographics, Social Studies, Junior Secondary School, Urban, and Rural

Introduction

Sight and hearing are the two senses that are mostly used in learning and teaching activities. Ogundare (2000) stated that these sense organs receive primary consideration in the development and selection of teaching materials. Visuals of various kinds such as photographs, paintings, diagrams, illustrations, pictures among others are good for classroom instruction. Their purpose is to enhance better understanding of the concepts by the learners. Presently, visual images are increasingly used in teaching and learning especially with free access to quality digital images on the Internet. The appropriateness of the images being utilized in social studies is crucial to enforce effective teaching and learning. In many teaching experiences, it has been established that relevant visual images can present information more quickly than lengthy and verbal descriptions. Researchers have proved that visual images can be used to promote positive learning experiences for social studies' students when used in a way that is consistent with the cognitive theory of visual learning. The recent development of visual images gave birth to Infographics.

Infographics is a physical likeness or representation of an object, person, animal, or thing or scene. It may be informed of photographed, painted, sculptured, or otherwise made visible. For instance, historical photographs serve as compelling records of people, places, events etc., that presents learning opportunities (Levstik & Barton, 2008). They are tangible for historical evidence (Library of Congress, 2010). Photographs can be used as an advanced organizer or as a pre-reading tool to generate interest or to accompany teacher explanations. As Jenny (2009) points out, photographs can serve as significant springboards for discussion. Furthermore, the use of historical photographs is an authentic activity as students can construct their own accounts of time in the past (Barton, 2001).

Infographics have an added advantage over text. As dual coding takes place in the memory, hence, it is easier for the learner to make cross connections between the two different codes and later retrieve information about the subject matter. It was also supported by Clement (1998) who opined that where infographics are properly utilized and appropriately matched to the specific learning task, perception, understanding, transfer of training, recall and retention can be enhanced. Gambari (2017) opined that effective utilization of infographics can promote academic performance and give learners increased conceptualization and understanding than a mere verbal explanation in any subject including Social studies.

Social studies is a unique and versatile subject in that it comprises a number of subjects that are taught interactively. Its importance cannot be overemphasized since it forms the basis of subjects like history, geography, sociology, anthropology among others. This is because it is meant to serve as a foundation. In spite of the importance of Social studies, students' performance is not encouraging due to poor utilization of teaching and learning resources (Mkpa, 2002). Similarly, Oke and Jekayinfa (2003) opined that the lack of effective utilization of relevant images as instructional media by social studies teachers in teaching the subject has been one of the factors responsible for poor students' performance in secondary schools.

In other to overcome this menace, social studies need to be taught properly and meaningfully so that students would acquire learning and permanent experience. For learning to be permanent, relevant and appropriate instructional materials should be employed. Social studies teaching with respect to its scope and nature, which is multidimensional, integrated and dynamic, cannot effectively take effect without the use of appropriate instructional materials.

Rural development is an essential building block for national development. Poverty cannot be eradicated without eliminating illiteracy among the rural populace and raises their level of knowledge. Abidogun (2006) emphasized that rural areas have greater challenges concerning educational development than the urban centers, due to the peculiar socio-economic and institutional structures of rural areas. Some of these challenges according to Anyaegbu (2004) are lack of zeal and interest by teachers due to poor and delayed salaries and poor condition of service and lack of incentive and motivation by the teachers.

Based on these, Abidogun (2006) reported that many teachers reject posting into the rural areas while those that do, treat their presence in such areas as a part-time assignment. It is a common practice that married female teachers serve in their husband's stations and these affect even distribution of teachers. Rural schools suffer more from this gender influence on teachers' distribution since most married women serve in urban schools. Parents complain of poor quality instruction, especially in rural schools. Quality instruction resulting in qualitative education can only be achieved through even distribution of available teachers (Ikoya, 2008).

Based on the feasibility study conducted by the researcher in Giwa Educational Zone of Kaduna State in Nigeria to see the situation on the use of infographics for teaching and learning in the Zone, but it was confirmed that infographics have not been used to teach social studies by the

teachers. This may be among the factors affecting the poor performance in social studies at the junior secondary school level in Nigeria. Based on this problem, this study is, therefore, investigates the impact of infographics in teaching and learning social studies concepts on the academic performance of junior secondary schools social studies students in Giwa Inspectorate (Educational) Division, Kaduna State, Nigeria.

Literature Review

Some scholars have previously researched into the effects of Infographics on the performance of students in various disciplines. For instance, Shaltout and Albarrak (2015) investigated the effect of Electronic educational infographics on the development of skills in dealing with the lighting in photography by postgraduate students. The findings showed that the group taught using educational infographics excelled than those of the control group. In another study, Rezaei and Sayadian (2015) explored the impact of infographics instruction on Iranian EFL learners' grammar learning based on the researcher's motivation to find empirical evidence in Iranian English language learners. It was found that infographic instruction was an effective instrument to help EFL learners learn foreign language grammar. Furthermore, Sang and Jeongwoo (2015) examined the effects of infographics instruction based on visual thinking with the infographics materials presented in physics textbooks targeting specialized vocational high school students and found that infographics enhanced students' understanding of scientific concepts and communication capability by improving visual thinking abilities, which have a positive impact on academic achievement and attitudes toward science.

In 2016, Dunlap and Lowenthal reported that Infographics supports cognitive processing, learning, and future recognition and recollection. In a study conducted by Yildirim (2016), it was affirmed that those participants in the study found infographics instructive and prefer to use them in basic learning processes. In supporting Yildirim, Çifçi (2016) conducted a similar study on the effects of infographics on students' achievement and attitude in geography course and found that using infographics in geography lessons increase academic achievement and attitude levels of the students. Jung and Kim (2016) conducted a study that analyzes the effect of infographic instruction to promote the use of the scientific model in the 'lens' unit of elementary science textbooks and found that infographics enhanced scientific model construction and students' scientific concept about the lens. In electioneering, Teunissen (2016) carried out a study to determine whether being exposed to an infographic (vs. to textual information) has a more positive effect on voting intention for a certain party when someone has a better attitude towards that party. It was found that information presented as an infographic positively affects attitude towards a party and voting intention more than when that same information is designed as a text. As information processing tool, Eun-Ju, and Kim, Ye, (2016) investigated how infographics may affect individuals' news processing, focusing on multimodality and interactivity as its signature characteristics. It was found that the graphical representation of news appeared to have heuristic appeals to those less involved in and less knowledgeable about the news topic, leading to more favorable news evaluation

In 2017, VanderMolen and Spivey conducted a project centered on the creation of an infographic in a health economics course and an introduction to health research course and found that infographic offers faculty an opportunity to apply active learning strategies to enhance student engagement, retention of information, and communication skills. Similarly, Mahmoudi, Mojtahedi, and Shams (2017) investigated the effect of Augmented Reality-based infographic on improving learning performance via t-paired test and found that the usability of AR-based infographic in improving learning performance. In another study, Gallagher, O'Dulain, O'Mahony, Kehoe, McCarthy, and Morgan (2017) investigated student perceptions, retention, applications, and activity generation of instructor-provided summary infographics in a massive online learning environment. The results revealed that learners perceived instructor-provided

summary infographics as useful and appealing for retaining, clarifying and understanding learning concepts. In addition, Al-Mohammadi (2017) investigated the effectiveness of using infographics as an approach to teaching the programming fundamentals on developing analytical thinking skills for high school students in the city of Makkah in Saudi Arabia. The results pointed out the effectiveness of using infographics strategy as an approach to teaching the programming fundamentals on developing analytical thinking skills.

Previous researches on school location have conflicting results. For instance, Faisal, Shinwari, and Mateen (2016) conducted a comparative study of the academic performance of urban and rural students in pharmacology and found a significant difference between the academic performance of urban and rural students in favour of Urban students. In another study conducted by Waters, Hughes, Forbes, and Wilkinson (2006) to determine whether the academic performance of medical students learning in rural settings differs from those learning in urban settings and found that the academic performance among students studying in rural and urban settings is comparable with the urban students. Similarly, Naik, Bhattacharjee, and Sutradhar (2017) compared mental health between rural and urban adolescent students of Chhattisgarh and found significant differences among rural and urban students in favour of urban. Furthermore, Young (1998) examined differences in student achievement between rural and urban schools in Western Australia and reported that location of the school had a significant effect upon student achievement, with students attending rural schools not performing as well as students from urban schools. However, Mlay (2010) reported that students in urban secondary school performed better than students at the rural school when taught English as the language of instruction in Tanzania. The poor academic performance of students in urban over those in rural areas may be attributed to the lack of facilities and teaching resources as compared to urban schools (Ovansa, 2017). This was confirmed by Opoku-Asare and Siaw (2015) that urban schools perform better than rural and peri-urban schools in visual art because they attract and admit junior high school graduates with excellent Basic Education Certificate Examination (BECE) grades, have better infrastructure, more qualified teachers, prestigious names, and character that motivate their students to do well.

Studies on gender issue remained controversial. For instance, Oviawe, Ezeji, and Uwameiye (2015) reported that gender had no significant effects on students' performance; and there was no significant interaction effect of gender and teaching methods on students' performance when taught Building Technology using reciprocal peer tutoring, peer tutoring, and conventional teaching method. Similarly, Fagbemi, Gambari, Oyedum, and Gbodi (2011), Alabi (2015) and Abdu-Raheem (2016) reported no significant difference between male and female students taught Social studies with a self-instructional computer-based package, video-mediated instruction, and using instructional materials respectively.

Statement of the Problem

Poor utilization of instructional materials for teaching and learning and over-dependence on chalk and talk method of teaching affected students' academic performance in many junior secondary schools in Kaduna state, Nigeria. This eventually, contributes to the poor performance of students not only in Giwa educational Division of Kaduna State but cut across Nigeria at large. Lack of using appropriate instructional materials was identified as one of the factors responsible for poor performance in Social Studies junior secondary schools level.

Literature revealed that Infographics enhance students understanding, bring out the images of reality and change the behaviour of students in learning new concepts. Infographics are indispensable for the success of the effective delivery of social studies instruction. However, studies have shown a lack of poor usage of Infographics for classroom instruction in Nigeria. Therefore, many studies on Infographics were conducted outside Nigeria. A variable such as

gender and school location were not considered and these are the gaps to be filled in this study.

If the problem of poor performance in Social Studies is not tackled, the purpose of the subject will be defeated. Social values that the subject aimed at inculcated will be truncated and youth will engage in social problems ranging from disrespect to elders, ransom, dishonesty, corruption, crime, delinquency among others. In view of the aforementioned, this study investigated the Impact of infographics on the academic performance of junior secondary school (JSS) social studies students in Giwa Educational Division, Kaduna State, Nigeria.

Research Questions

The following research questions were raised to guide the study:

- (i) What is the performance of students taught social studies using infographics and those taught with lecture method?
- (ii) What is the performance of male and female students taught social studies using infographics?
- (iii) What is the difference between the performance of students taught social studies using infographics instructional package in rural and urban areas of Giwa Educational Division Kaduna State?

Research Hypotheses

The study is based on the following null hypotheses:

- Ho₁:** There is no significant difference between the performance students taught social studies using infographics instructional package and those taught with lecture method.
- Ho₂:** There is no significant difference between the performance of male and female students taught social studies using infographics instructional package.
- Ho₃:** There is no significant difference between the performance of students in the rural and urban areas taught social studies using infographics instructional package.

Methodology

Research Design

The research design used for the study is quasi-experimental design involving pretest, posttest, experimental and control groups design. The experimental groups were taught social studies using infographics instructional package as a treatment, while, the control group was taught social studies using conventional teaching method. According to Hopkins (1980), quasi-experimental design is suitable for the study of both large and small population. The design allows for making inferences and generalization from a representative sample of the population.

Sample and Sampling Technique

The population of the study consists of 31 public junior secondary schools with 12,552 male students and 8,831 female students in Giwa Educational Division Kaduna State, Nigeria totaling 21,383 students as at 2016/2017 academic session (Kaduna State Ministry of Education, 2017). Three public secondary schools which include Government Secondary School Kwangila as experimental group A, Government Secondary School Bomo as control and Government Secondary School Iyatawa as experimental group B were purposively selected with 175 students which made up of 102 male and 73 female students. Two of these schools were from the rural area while the third school is from an urban location. The sample size of the study was drawn from the intact classes of JSS-III A from each sample schools and used for this study. The reason for selecting both male and female is to determine the gender impact on the performance of social studies concepts taught using infographics instructional package. Details of the sample schools and respondents are presented in table 1:

Table 1: Sample of the study

| S/N | Names of Schools | Groups | Sample | | Total |
|--------------|--------------------------------------|----------|------------|-----------|------------|
| | | | Male | Female | |
| 1 | Government Secondary School Kwangila | Exper. A | 38 | 29 | 67 |
| 2 | Government Secondary School Iyatawa | Exper. B | 30 | 12 | 42 |
| 3 | Govt. Sec. School Bomo | Control | 34 | 32 | 66 |
| Total | | | 102 | 73 | 175 |

Instrumentation

The instrument for data collection is the researchers' made Social Studies Achievement Test (SSAT) which consists of 50 items multiple choices objectives test. as possible answers to the question. Only one of the four options were the correct answer. The students responded to the instrument in two sections. The first part (section A) is for eliciting information on the students' personal data, while section B contains multiple-choice objective questions for students to answer. The drafted copy of the instrument was presented to the Social Studies specialists to determine its face and content validity. The corrections and suggestions made were used to produce the final copy of the instrument. Kerlinger (1986) and Gay (1976), hold the view that, the validation of the content of the research instrument by experts is an important and acceptable technique. The SSAT was subjected to pilot test in one of the public secondary schools in Sabon Gari Local Government Area, Kaduna State, Nigeria. Twenty students of Government Secondary School Samaru participated in pilot testing. The data obtained was subjected to analyses using Pearson Product Moment Correlation and 0.74 reliability coefficient was obtained. The value obtained was adequate and this implies that the instrument is reliable.

Methods of Data Collection and Analyses

The researcher obtained the authorization letter from the Department of Educational Foundations and Curriculum to the selected schools. The teachers of those schools were trained as research assistants. The pretest was administered to the three selected schools simultaneously. Students in experimental one, two and control groups were taught the Social Studies concept of Nigeria ethnicity and culture; family; transportation system; national economy; government system; socio-political crisis; and Nigeria democratic system. Posttest was administered after six weeks of treatment. The data obtained from the administration of posttest from the respondents were subjected to data analyses. The research questions were analyzed using mean and standard deviation while hypotheses were analyzed using ANCOVA and tested at 0.05 level of significance.

Results

Research Question One: What is the performance of students taught social studies using infographics instructional package and those taught with conventional teaching method?

In answering research question one, mean scores of students in the experimental group (infographics instructional strategy) and the control (conventional teaching method) group were analyzed using mean and standard deviation as shown in Table 2.

Table 2: Mean and standard deviations of students of students in experimental and control groups

| Group | N | Pretest | | Posttest | | Mean Gain |
|----------------------|----|---------|------|----------|------|-----------|
| | | Mean | SD | Mean | SD | |
| Experimental Group 1 | 64 | 16.56 | 3.23 | 39.33 | 2.30 | 22.77 |
| Control | 64 | 17.18 | 2.72 | 39.85 | 1.86 | 22.69 |

Table 2 shows the mean and standard deviation of the pre-test and post-test scores of students in the experimental and control groups. From the result, it can be deduced that the mean score and standard deviation of the pre-test for students in experimental group (infographics instructional package) students are 16.56 and 3.23 while the mean score and standard deviation of the same students in the post-test are 39.33 and 2.30. The mean gain is 22.77 in favour of the post-test scores. Similarly, the mean score and standard deviation of the pre-test for students in control group are 17.18 and 2.72 while the mean score and standard deviation of the same students in the post-test are 39.85 and 1.86 respectively. The mean gain is 22.69 in favour of the post-test score. Therefore, students taught Social Studies using infographics had a higher mean gain score (22.77) than those taught with the lecture method (22.69).

Research Question Two: What is the performance of male and female students taught social studies using infographics instructional package?

In answering research question two, mean scores of students in urban and rural areas were analyzed using mean and standard deviation as shown in Table 3.

Table 3: Pre-test and post-test scores of students in urban and rural areas taught social studies using Infographics instructional package

| Group | N | Pretest | | Posttest | | Mean Gain |
|---------------|----|---------|------|----------|------|-----------|
| | | Mean | SD | Mean | SD | |
| Urban Schools | 64 | 16.56 | 3.23 | 39.33 | 2.30 | 22.77 |
| Rural School | 42 | 7.26 | 1.58 | 16.21 | 2.58 | 8.95 |

Table 3 showed the mean and standard deviation of the pre-test and post-test scores of students in the Urban area and those in the Rural area. From the result, it can be deduced that the mean score and standard deviation of the pre-test for students in the Urban area are 16.56 and 3.23 while the mean score and standard deviation of the same students in the post-test are 39.33 and 2.30. The mean gain is 22.77 in favour of the post-test scores. Similarly, the mean score and standard deviation of the pre-test for students in Rural area are 7.26 and 1.58 while the mean score and standard deviation of the same students in the posttest are 16.21 and 2.58 respectively. The mean gain is 8.95 in favour of the posttest score. Therefore, students in the Urban area had a higher mean gain score (22.77) than those in Rural area (8.95).

Research Question Three: What is the difference between the performance of students taught social studies using infographics instructional package in rural and urban areas of Giwa Educational Division Kaduna State?

In answering research question three, mean scores of male and female students in the experimental group I (infographics instructional strategy) were analyzed using mean and standard deviation as shown in Table 4.

Table 4: Pretest and posttest scores of male and female students taught Social Studies using Infographics instructional package

| Group | N | Pretest | | Posttest | | Mean Gain |
|--------|----|---------|------|----------|------|-----------|
| | | Mean | SD | Mean | SD | |
| Male | 38 | 16.66 | 2.31 | 39.47 | 2.01 | 22.81 |
| Female | 38 | 17.86 | 3.09 | 40.34 | 1.54 | 22.48 |

Table 5 showed the mean and standard deviation of the pre-test and post-test scores of male and female students in the experimental group I (Infographics Instructional Strategy). From the result, it can be deduced that the mean score and standard deviation of the pre-test for the male students are 16.66 and 2.31 while the mean score and standard deviation of the same students in the post-test are 39.47 and 2.01. The mean gain is 22.81 in favour of the post-test scores. Similarly, the mean score and standard deviation of the pre-test for the female students are 17.86 and 3.09 while the mean score and standard deviation of the same students in the post-test are 40.34 and 1.54 respectively. The mean gain is 22.48 in favour of the post-test score. Therefore, female students had a higher mean gain score (22.81) than the females (22.48).

Hypotheses Testing

Hypothesis One: There is no significant difference between the performance of students taught social studies using infographics instructional package and those taught with conventional teaching method.

To test this hypothesis, the achievement scores of students exposed to Infographics and those taught with lecture method were analysed using ANCOVA as shown in Table 5.

Table 5: ANCOVA result of achievement scores of experimental and control groups

| Source | Type III Sum of Squares | df | Mean Square | F | p-value |
|-----------------|-------------------------|-----|-------------|----------|--------------------|
| Corrected Model | 8.948 | 2 | 4.474 | 1.018 | .364 |
| Intercept | 6123.673 | 1 | 6123.673 | 1393.206 | .000 |
| Pretest | 0.008 | 1 | 0.008 | 0.002 | .966 |
| Group | 8.899 | 1 | 8.899 | 2.025 | .157 ^{ns} |
| Error | 562.609 | 128 | 4.395 | | |
| Total | 205953.000 | 131 | | | |
| Corrected Total | 571.557 | 130 | | | |

ns = not significant $P < 0.05$

Table 6 shows the ANCOVA results of the achievement scores of the group taught using the Infographics instructional package (experimental group) and the one taught with conventional teaching method (control group). From the table, the $F(1,128) = 2.025$, $p > 0.05$. This indicates that there is no significant difference between the achievement scores of the experimental and control groups. Hence, hypotheses one is not rejected. Therefore, there is no significant difference in the achievement scores of students taught Social Studies using Infographics Instructional Package and those taught with lecture method. This reveals that the treatment has no effect on the students' academic achievement.

Hypothesis Two: There is no significant difference between the performance of male and female students taught social studies using infographics instructional package.

In testing hypothesis two, the achievement scores of students exposed to Infographics Instructional package in Urban and Rural areas were analyzed using ANCOVA as shown in Table 6.

Table 6: ANCOVA result of achievement scores of students exposed to Infographics in rural and urban schools

| Source | Type III Sum of Squares | df | Mean Square | F | p-value |
|-----------------|-------------------------|-----|-------------|----------|---------|
| Corrected Model | 14425.478 | 2 | 7212.739 | 1531.156 | .000 |
| Intercept | 2831.177 | 1 | 2831.177 | 601.016 | .000 |
| Pretest | 2.250 | 1 | 2.250 | .478 | .491 |
| Group | 2580.345 | 1 | 2580.345 | 547.768 | .000 |
| Error | 499.329 | 106 | 4.711 | | |
| Total | 117945.000 | 109 | | | |
| Corrected Total | 14924.807 | 108 | | | |

*: Significant at $p < 0.05$

Table 6 shows the ANCOVA results of the achievement scores of the students in Rural schools taught Social Studies using Infographics Instructional Package. From the table, the $F(1,106) = 547.768$, $p < 0.05$. This indicates that there is a significant difference between the achievement scores of students in Urban and Rural schools. Hence, hypothesis two is rejected. Therefore, there is a significant difference in the achievement scores of students taught Social Studies using Infographics in favour of students in Urban schools.

Hypothesis Three: There is no significant difference between the performance of students in the rural and urban areas taught social studies using infographics instructional package.

In testing hypothesis, the achievement scores of male and female students in the experimental group (Infographic) were analyzed using ANCOVA as shown in Table 7.

Table 7: ANCOVA results of the achievement scores of male and female experimental group

| Source | Type III Sum of Squares | df | Mean Square | F | p-value |
|-----------------|-------------------------|----|-------------|----------|---------|
| Corrected Model | 10.695 | 2 | 5.348 | 1.582 | .214 |
| Intercept | 3779.516 | 1 | 3779.516 | 1117.864 | .000 |
| Pretest | 1.847 | 1 | 1.847 | .546 | .463 |
| Gender | 9.402 | 1 | 9.402 | 2.781 | .101 |
| Error | 206.242 | 61 | 3.381 | | |
| Total | 101500.000 | 64 | | | |
| Corrected Total | 216.937 | 63 | | | |

Ns: not significant at $p > 0.05$

Table 7 shows the ANCOVA results of the achievement scores of male and female students in the experimental group (Infographics). From the result, there is no significant difference between the mean achievement scores of the male and female taught Social Studies using Infographics Instructional Package $\{F(1,61) = 2.781, p > 0.05\}$. Therefore, hypothesis three is not rejected. This implies that male and female performed equally better, therefore, infographics is not gender bias.

Discussion

Finding from hypothesis one revealed that students taught Social Studies using infographics instructional package did not perform better than those taught with the conventional method. This finding contradicts that of Shaltout and Albarrak (2015), Çifçi (2016), and Yildirim (2016)

reported that the postgraduate students taught photography using educational infographics excelled than those of the control group; that infographics increase academic achievement and attitude levels of the students in geography; that students prefer to be taught using infographics respectively. Furthermore, this finding disagrees with that Gebre and Polman (2016) who reported that students were able to determine representational adequacy in the context of providing peer feedback. It also disagrees with that of Eun-Ju and Kim (2016) who found that the graphical representation (infographics) appeals to those less involved in and less knowledgeable about the news topic, leading to more favorable news evaluation. In addition, the finding of this study disagrees with that of supports that of Mahmoudi, Mojtahedi and Shams (2017) and Sang and Jeongwoo (2015) who found that the usability of Augmented Reality-based infographic improved students' learning performance; and that infographics enhanced students' understanding of scientific concepts and communication capability by improving visual thinking abilities, which have a positive impact on academic achievement and attitudes toward science. Similarly, it disagrees with that of Gallagher, O'Dulain, O'Mahony, Kehoe, McCarthy, and Morgan (2017) who reported that learners perceived instructor-provided summary infographics as useful and appealing for retaining, clarifying and understanding learning concepts. It also disagrees with the finding of Jung and Kim (2016) who found that infographics enhanced scientific model construction and students' scientific concept about the lens. Furthermore, is not in agreement with the finding of Rezaei and Sayadian (2015) who found that infographic instruction was an effective instrument to help EFL learners learn foreign language grammar. It also disagrees with the study of Al-Mohammadi (2017) who found that using infographics strategy very effective approach to teaching the programming fundamentals on developing analytical thinking skills.

The outcome of hypothesis two revealed that students in Urban area performed better than those in Rural when taught Social Studies using infographics instructional strategy. This finding supports that of Faisal, Shinwari, and Mateen (2016) who conducted a comparative study of the academic performance of urban and rural students in pharmacology and found a significant difference between the academic performance of urban and rural students in favour of Urban students. It also in agrees with the study of Waters, Hughes, Forbes and Wilkinson (2006) who carried out a study to determine whether the academic performance of medical students learning in rural settings differs from those learning in urban settings and found that the academic performance among students studying in rural and urban settings is comparable with the urban students. Similarly, the finding supports that of Naik, Bhattacharjee, and Sutradhar (2017) who compared mental health between rural and urban adolescent students of Chhattisgarh and found significant differences among rural and urban students in favour of urban. Similarly, it supports that of Young (1998) who examined differences in student achievement between rural and urban schools in Western Australia and reported that location of the school had a significant effect upon student achievement, with students attending rural schools not performing as well as students from urban schools. This finding is in line with that of Mlay (2010) reported that students in urban secondary school performed better than students at the rural school when taught English as the language of instruction in Tanzania.

The superiority of the academic performance of students in urban over those in a rural area may be attributed to the lack of facilities and teaching resources as compared to urban schools (Ovansa, 2017). This was confirmed by Opoku-Asare and Siaw (2015) who found that urban schools perform better than rural and peri-urban schools in visual art because they attract and admit junior high school graduates with excellent Basic Education Certificate Examination (BECE) grades, have better infrastructure, more qualified teachers, prestigious names, and character that motivate their students to do well.

The finding from hypothesis three revealed that there is no significant difference in the performance of male and female students taught Social Studies using infographics instructional strategy. This in agreement with that of Oviawe, Ezeji, and Uwameiye (2015) who reported that gender had no significant effects on students' performance; and there was no significant interaction effect of gender and teaching methods on students' performance when taught Building Technology using reciprocal peer tutoring, peer tutoring, and conventional teaching method. Similarly, it supports the findings of Fagbemi, Gambari, Oyedum, and Gbodi (2011), Alabi (2015) and Abdu-Raheem (2016) who reported no significant difference between male and female students taught Social studies with a self-instructional computer-based package, video-mediated instruction, and using instructional materials respectively.

However, the finding of this study contradicts that of Ghazvini and Khajehpour (2011) who reported that gender differences were not found in an external locus of control, in academic self-concept, and in study aids and test strategies when taught literature and Mathematics. It also contradicts the finding of Nnamani and Oyibe (2016) who reported that the mean achievement score of female secondary school students was higher than the mean achievement scores of male students when taught Social studies at Junior Secondary school.

Conclusion

As a result of findings from the study, it was concluded that no significant difference exists in the performance of JSS III students taught social studies using infographics and those taught with lecture method at junior secondary schools in Giwa Educational Division Kaduna State. It was also concluded that, significant difference does not exist in the performance of male and female students taught social studies using infographics in junior secondary schools in Giwa Educational Division Kaduna State, this is because equal opportunities were given to both male and female students. It was affirmed that school locations had effects on the performance of students.

Recommendations

Based on the findings from this study, it was recommended as follows that:

- (i) Infographics should be used to compliment lecture method of teaching social studies at junior secondary schools.
- (ii) Social studies teachers should try as much as possible to bridge the gaps existing between the male and female students in the study area; and
- (iii) school location should be considered by teachers while planning the use of infographics materials in junior secondary schools as students from urban schools tends to perform better than that of the rural schools in junior secondary schools in Giwa Educational Division Kaduna State.

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