



**GOOGLE MAPS (GM) AS DETERMINANT OF
ACADEMIC PERFORMANCE AND INTEREST OF SOCIAL
STUDY STUDENTS: FOCUS ON TERTIARY
INSTITUTIONS IN TARABA STATE, NIGERIA**

MOHAMMED TUKUR

Department of Curriculum and Instruction, College of Education, P.M.B 1021,
Zing, Taraba State

Abstract

Technological advancement has provided different gadgets for teaching-learning process in various fields of study. In social studies cohort for instance, Google Maps has been extolled for effective teaching and learning of students. But the extent at which Google Maps improve on academic performance and interest of social studies students is not yet documented. Therefore, the current study examined GM as determinant of academic performance and interest of social studies students in tertiary institutions of learning in Taraba State. The study was guided by three (3) research questions and three (3) research hypotheses while purposive sampling technique was used to select one hundred and sixty (160) penultimate students out of one thousand six hundred and seven (1,607) total population. Two instruments titles Google Maps in relation to Social Studies Performance Test- GMSSPT and Google Maps in relation to Social Studies Interest Rate- GMSSIR, which yielded 0.86% reliability coefficient after using split half analysis with the aid of SPSS were used for data collection. The data collected were analyzed using mean and standard deviation to answer research questions while Chi-square and T-test analysis as deemed appropriate were used to test the hypotheses at 0.05 level of significance. The findings revealed that GM significantly determine mean performance score of tertiary institution students in social studies class; GM significantly determine interest of tertiary institution students in social studies class as well as GM does not determine differences in mean performance scores of male and female tertiary institution students in social studies class. It was concluded that Google Maps tools are viable and needful instruments for attracting students' interest in the field of social studies and subsequently improve on academic performance. Among others, it was recommended that the management of tertiary institutions of learning in Taraba State should consider Google Maps integration into social studies cohort in order to enhance on students' academic performance and instill relevant modern skills

expected of environmentalist in the world of work; and that inclusion of Google Maps in social studies class will help streamline gender stereotyping in social studies unit thereby ensuring balance of performance on the basis of gender and increase enrolment of female students into the field of social studies.

Keywords: Google Maps, social studies students, academic performance, student's interest, tertiary institution of learning.

Introduction

Educational programme is meant to instill relevant skills and knowledge required in a particular field of study in accordance with world best practices. By and large, students' performance is usually utilized to determine the degree of knowledge and or skills attained in the field. This explains why academic performance of students either at secondary or tertiary education in Nigeria has become a source of concern to all and sundry. In fact, the problem of underperformance in environmental science subjects has attracted the attention of educationists in general and researchers in the field of education in particular. Scholars like Akeju and Rotimi (2015) have taken pains in investigating the etiological starting point for understanding the phenomena of students' poor academic performance in teacher-made test- TMT and national examinations. For these authors, school-related factors (e.g., school location, school population or class size, etc), teacher-related factors (e.g., teachers' qualification, experience, competency, instructional method, etc), and student-related factors (e.g., learners' ability, motivation, interest, etc) are responsible for poor academic performance of students in TMT and standardized examinations such as WAEC, NECO and NABTEB in Nigeria. For Nadeem (2011), academic performance of students reveals the amount of knowledge acquired in subject contents against individual learner offering the subject. Simply put, good academic performance signifies higher chances of attaining objectives of education otherwise there is wide gap between students' knowledge and attainment of objectives of education either at secondary or tertiary level.

Moreover, Shaibu (2014) identified inappropriate pedagogical approach as one of the factors responsible for persistent poor performance in social studies among tertiary institution students in the north-central, Nigeria. Little wonder, Ling and Boo (2013) observed that pedagogical method of teaching environmental science subjects such as social studies, geography, etc in tertiary institutions is didactic and does not encourage students' active participation. That is, the instructional method encourages passive learning and forming of misconceptions by students which

influence how they interpret and construct new knowledge. For Kunter (2012), the instructional method affects non-cognitive aspects, which include motivational orientations such as interest in social studies. To this end, instructional method does not only affect academic performance of students but also attention and interest in social studies lessons. In support of this, Krapp (2012) described interest as stressed person-object-relation, which is marked by the features of cognition, emotion and valence. Hence, pedagogical approach is closely linked to psychological expression of knowledge acquired in terms of academic performance as well as psychological disposition of learners' interest in social studies.

However, owing to technological advancement and happenings in the 21st century society, meaningful instructional strategies are becoming more important for teaching social studies to keep abreast of these developments and happenings as they relate to process of learning. In fact, scholars like Akeju (2015) and Gallenstein (2013) have shown the efficacy of innovative teaching strategies in reforming the way social studies is being taught at tertiary institutions of learning. This is based on the feelings that social studies is an essential social science that equips students with a body of knowledge to make them functional in life (Kerski, 2014). For Gilbert (2012), studying social studies enables students to understand and do something about some of the issues and problems facing the society and the world including climate change, energy dependence, war and regional conflict, globalization and international terrorism. Little wonder, Akintade (2013) averred that social studies as a subject, builds on students' experiences, helping them formulate questions, develop intellectual skill and find answers to issues affecting their lives as it introduces them to distinctive investigative tools such as maps, fieldwork, and use of powerful communication technologies. Simply put, if social studies is properly taught, it inculcates a wide ranging combination of skills, drawing ideas from numerous sources so as to instill a wider perspective into the students.

The assertion above lends credence to the fact that rapid technological development has given opportunities to production of several devices, gadgets and tools that can be used in the field of education. Accordingly, it is necessary to know the technology options to be used in teaching social studies to enable students benefit optimally. In spite of different technology options for teaching social studies, Birbili (2016) was of the view that Google Maps (GM) is an effective tool to help students represent information visually, not only to stimulate but also increases brain activity. In this wise, GM is an effective instructional tool for teaching social studies and maintain students' interest in social studies lessons.

Of course, Google Maps is an online mapping service that provides street maps, a route planner for traveling by foot, car, bike or public transport and an urban business locator for numerous countries around the world. Demirci (2013) argued that Worldwide, GM gained popularity since the inception of the World Wide Web in 1991 with the capacity to project information such as man-made features and road networks. In fact, several studies reckoned that GM may enhance spatial and geospatial thinking of tertiary institution students. Henry (2016) equally referenced that this tool could improve students' critical thinking as it allows to apply knowledge in scientific inquiry, problem solving, and synthesis. In other words, GM provides a platform for 'do it yourself (DIY)' among students which is scientific approach of instilling critical thinking and problem-solving skills thereby improving on academic performance of students.

In fact, scholars have shown that social studies students in this age prefer to be taught with technology such as Google Maps (GM) as against traditional method of paper work (Baker, 2012). Though there are mixed reports as to whether GM positively impact on academic performance of student or not. For instance, Demirci (2018) revealed that the majority of respondents (61%) agree that GM helps with regard to visualizing or understanding social concepts; whereas the study by Klein (2017) indicated the percentage of students who reported that they understood nothing at all when using GM (58%) was the highest of all media included in the survey. An additional 10.2% reported bad understanding when using GM in social studies lesson. However, studies involving two group designs noted that GM achieves higher scores than the control group, which often consists of students using conventional methods such as social maps or paper maps/atlas (Aarons, 2013). In contrast, some studies also show no significant difference or a higher performance of the non-GM group whereas one group design seems to show an improvement from the pre- to the post-test with regard to content knowledge (Fun, 2015). Also, West (2013) reported that working with GM improves the understanding of complex contents, interactions and processes both in the environment and the society, as well as systemic thinking and subject competencies thereby enhancing academic performance of students. This is to say that the functionality of a GM enables students to have better knowledge of the contents especially when combined with projector. In this wise, it enables one to stand before the overhead, mix and match the layers at will, magically changing classification schemes and modifying symbols, colours, patterns and combinations. For scholars like Cremer (2014), frequent use of GM fosters a wide variety of skills and competencies such as methods competency, general computer and media literacy, spatial thinking skills and spatial/social awareness, map competency,

personal responsibility, self-directed learning and social competency, critical thinking skills, (artistic) creativity and reading literacy. For this author, GM makes learning easier with inculcation of practical skills expected of social studies students in the modern age.

Obviously, GM is an effective technological tool for teaching social studies at all levels of education, especially at tertiary institution where students are at the verge of career practice. Though there is still an inconclusive debate concerning whether GM influences students' learning in social studies. For example, Clark (2014) argued that students learned equally well regardless of instructional media use. For this author, GM is a mere vehicle that delivers instruction but does not influence students' achievement in terms of content retention and knowledge acquired. Whereas studies have established the correlation between GM and interest of students in social studies classroom. For instance, Molenda (2014) reported the processing capabilities of GM to attract students' attention and interest in classroom activities. The report based on 20-years of research outcomes by the International Society for Technology Education (ISTE), it affirms that GM technique provides a conducive environment in terms of engagement and activity for learners thereby restraining attention during lesson delivery and attracts interest in the class work (ISTE, 2018). Hence, GM is a viable tool to promote attention and sustain students' interest in classroom activity.

Numerous scholars have established the impact of technology integrated teaching on students' interest and have proven that technology is a useful tool for retaining and sustaining students' attention (Dalal, 2016; Gungadeen, 2015). Among others it was revealed that GM encourages students' participation in the learning process by guiding them to gather the necessary and important information, search for solutions to the problem and attain the right solution (Dalal, 2016). In other words, the activities conducted in a GM integrated class encourages students to use the internet resources actively and to find information for completing mapping projects unlike paper maps where information is provided by lecturer.

In the same vein, the study conducted by Aladag (2015) revealed that the introduction of GM in social studies class has a positive effect on students' attitudes and interests towards the lessons. The study affirmed that GM integrated lesson promoted academic success among high risk failure and low interest students in social studies. For Milson (2018), GM is not only germane to retaining students' interests in social studies lessons but also provides students the opportunities to work with social data within the locality thereby calibrating knowledge and interest in local environment. To this end, GM is an essential modern tool to facilitate effective

teaching and learning as well as connecting students' interest with social studies as a subject and local environment.

However, student's gender has been identified as one of the factors that may affect academic performance of social studies students even when they are taught with modern technologies such as GM. In fact, researchers in the field of education have shown that women's participation and achievement in Science and Technology are too low owing to some avoidable reasons such as unnecessary fear for calculations and terminologies in such subjects. Suleiman (2014) confirmed that gender inequalities are interwoven with social class, ethnicity, sexuality and disability as the findings revealed that the proportion of male students enrolling in preparatory schools before they pass English language tests is 74.5% and 25.5% for females. The study further established significant difference in the academic performance of male and female students in favour of females in terms of comprehension of information, evaluation of arguments and CGPA. To this end, it is obvious that female students prefer Arts/Humanity courses rather than environmental science courses.

Regarding GM use, studies by Lee (2015) and Kinzel (2016) revealed that improvement in performance or the post-test scores after GIS treatment do not significantly differ between male and female students in social study assessment. Whereas the study showed higher overall performance of female students in a GM group over male students in social studies assessment. That is, GIS does not significantly impact academic performance of male and female students in social studies but GM significantly impact academic performance of female students. Besides, in one-group design study, Hedges and Newell (2015) discovered that male students have (4.1 G-mean score performance) social skills and social-content knowledge than female students who have (1.8 G-mean score performance) in GIS integrated social studies lessons. Also, female students have abysmal low (1.6 G-mean score performance) after exposure to GM integrated social studies lessons while male students maintain better (3.9 G-mean score performance) after attending GM integrated social studies lessons. Evidently, GIS and GM significantly enhance academic performance of male students in social studies than female counterparts while GM does not have significant impact on academic performance of female student. Conversely, other studies have shown no significant difference in academic performance of male and female students in social studies (see Adeosun, 2012; Abdu-Raheem, 2012).

In a study, Popoola (2012) reported that irrespective of pedagogical technique applied, female students are very good in English and Art subjects but Social Science, Mathematics and Technology are masculine. Simply put, the under representation of

women in social studies and other environmental science fields may likely be a reflection of low participation and under-achievement. This is supported by Njoku (2014) who confirmed that Social Studies and Technology teachers pay more attention to male students than female counterparts. This author stressed further that there are more male environmental science teachers (Geography, Social Studies, etc) and professionals than female role models in environmental science.

At this juncture, it is important to profess that social studies is a subject taught to children from Basic1-9 and a field of study at tertiary institutions (University and College of Education) where experts are groomed and turned out for professional services in the field. However, evidence from the literature shows that female students tend to pursue career in Arts and Humanity rather than Environmental Science (involving Geology, Geography or Social Studies). Perhaps, this explains why Njoku (2014) confirmed that girls believe that environmental science is too difficult and not important for the future of girl child. Stressing that the irrespective of teaching methods used, male students are environmental science-inclined than female counterparts. In other words, despite the incredible experience that GM offers students in social studies class, students' academic performance is greatly influenced by gender. This is based on the feelings that gender aligns with physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine population.

From the foregoing, it is obvious that GM tools have become pervasive that they are emerging in tertiary institutions of learning and being integrated into social studies classes in a number of countries (Oppong & Ofori-Amoah, 2012). Aladag (2015) asserted that 73% of higher institutions of learning in Capricorn district municipality of Limpopo South Africa integrated Earth Map into teaching of social studies. Whereas Kaya's research on the level of Google Maps integration in social studies class revealed 81% (very high level) integration in environmental science classes and 65% (high level) integration in Arts classes across post-secondary schools in Bogoma district of Kenya (Kaya, 2012).

Besides, Artvinli (2013) asserted that introduction of Earth Map in social studies classes has a positive effect on academic performance and students' interest towards social studies lessons. However, little has been said about GM integration in environmental science courses like social studies in public tertiary institutions of learning in Taraba State. In order to provide up-to-date information in this direction, the current study examined Google Maps as determinant of academic performance and interest of tertiary institution students in social studies in Taraba State, Nigeria.

Statement of the Problem

Tertiary institutions of learning remain moulding and preparatory ground for professionals in various fields of endeavour including teaching profession. Therefore, professionals and experts being trained in such learning environment ought to be up-to-date in terms of technological awareness and usage in their fields so as to deliver best services. However, it has been recently observed that students in cohorts of environmental science are not exposed to relevant modern technology for topnotch technical know-how in those fields thereby affecting students' academic performance. Perhaps Shaibu (2015) was right to have asserted that with the current performance of students in environmental science courses, Nigeria and indeed Taraba State will soon be deserted of environmentalists, geologists, geographers and experts in social studies as well as other professions that require in-depth knowledge of environment.

Also, there is no doubt that gender stereotyping influences students' interest in participating in social studies class. Evidence from various academic sources has indicated that social studies as a course of study is gender sensitive (Filgona, 2016). This author further stressed that inputs from girls during social studies classes in secondary schools are always considerably lower. While boys like to ask more questions and engage the teacher during lesson delivery, the girls would rather choose to remain inactive. It is therefore important to ascertain whether inclusion of modern tools such as Google Maps might determine academic performance and interest in social studies class among tertiary institution students in Taraba State, Nigeria.

Purpose of the Study

This study ascertained whether or not Google Maps (GM) determine academic performance and interest of tertiary institution students in social studies class in Taraba State. Specifically, the study sought to determine:

1. Whether Google Maps (GM) determine academic performance of tertiary institution students in social studies class in Taraba State.
2. Whether Google Maps (GM) determine interest of tertiary institution students in social studies class in Taraba State.
3. Whether Google Maps (GM) determine male and female students' academic performance in social studies class in Taraba State.

Research Questions

The following research questions were formulated to guide the study:

1. Does Google Maps (GM) determine mean performance score of tertiary institution students in social studies class?
2. Does Google Maps (GM) determine mean interest score of tertiary institution students in social studies class?
3. Does Google Maps (GM) determine differences in mean performance scores of male and female tertiary institution students in social studies?

Research Hypotheses

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

- H₀₁:** Google Maps (GM) does not significantly determine mean performance score of tertiary institution students in social studies class.
- H₀₂:** Google Maps (GM) does not significantly determine mean interest score of tertiary institution students in social studies class.
- H₀₃:** Google Maps (GM) does not significantly differentiate between mean performance scores of male and female tertiary institution students in social studies class.

Methodology:

Design

The study adopted experimental research design, which is an established technique to determine cause and effect relationships (Fraenkel, Wallen & Hyun, 2012). Specifically, non-equivalent quasi-experimental design was employed to determine the cause and effect relationship that is based on randomly assigning two groups of social studies students. This method enabled the researcher to administer GIS instructional method in order to determine the effect on a course's (Social Studies) performance test and interests.

Population

This study comprised social studies students from four tertiary institutions of learning in Taraba State that offer social studies as a field of study (i.e. Federal University Wukari, Taraba State University Jalingo, Peacock College of Education Jalingo and College of Education Zing). The available records from the Heads of Department of these institutions revealed a total of one thousand six hundred and seven (1,607) social studies students.

Sample and Sampling Technique

Sample of one hundred and sixty (160) students were selected from the study population. Purposive sampling technique was used to select only penultimate

students (300 level in the case of university and 200 level in the college of education) who are not engulfed with project writing as final year students or 100 level students who are still very new in the department. Simple random sampling technique was used to select forty (40) social studies students from each institution while split-half method was used to divide them to treatment and control groups with eighty (80) participants in each group.

Instruments

Two instruments (Google Maps in relation to Social Studies Performance Test- GMSSPT and Google Maps in relation to Social Studies Interest Rate- GMSSIR) were used for data collection for this study. The two instruments were designed to measure student participants after exposing them to some Social Studies Topics with GM after four (4) weeks of intervening period. The GMSSPT and GMSSIR contained 15 and 12 items respectively.

Validity and Reliability

The instruments were given face and content validity in terms of scope of coverage, content relevance, ambiguity and vagueness of expression. A pilot study was conducted on 30 respondents in a school with similar characteristics of the study population but outside the study area. Cronbach's Alpha Reliability Analysis was employed (*with the aid of Statistical Package for Social Sciences-SPSS*), which the reliability coefficient yielded **0.89 and 0.83** for GISSPT and GISSIR respectively while the mean value stood at **0.86** percent.

Analysis

Data collected from the instruments were analyzed using mean to answer research questions while Chi-square and T-test Analysis were used for testing research hypotheses 1-2 and 3 respectively at 0.05 level of significance. The decision was that, if the calculated value p was less than the level of significance, the null hypothesis was not accepted and vice versa (computation was done with SPSS package).

Results:

Answering of Research Questions

Research Question 1: Does Google Maps (GM) determine mean performance score of tertiary institution students in social studies class?

Table 1: GM as a determinant of mean performance score of tertiary institution students in social studies class

S/N	GM and Mean Performance Score	Mean	SD	Remarks
1.	GM makes students visualize social concepts.	3.38	0.78	Accepted
2.	GM class exposes students to complex social contents.	3.24	0.79	Accepted

3.	GM class has a way of increasing systemic thinking of learners.	3.36	0.78	Accepted
4.	Frequent use of GM tool fosters wide variety of skills in students.	3.51	0.80	Accepted
5.	GM tool builds critical thinking skills in social space.	3.25	0.79	Accepted
	Grand Mean	3.34	0.78	

Source: Field Study (2023).

Table 1 above reveals mean performance score of tertiary institution students in social studies class exposed to GM in the study area. Based on the table, the mean performance scores of 3.38, 3.24, 3.36, 3.51 and 3.25 including the grand mean of 3.34 are above the acceptance mean value of 2.5.

The scores from the table indicated that all items 1-5 impact mean performance scores of social studies students after exposure to GM integrated classroom. The table revealed that GM makes students visualize social concepts, GM class exposes students to complex social contents, GM class has a way of increasing systemic thinking of learners, frequent use of GM tool fosters wide variety of skills in students as well as GM tool builds critical thinking skills in social space with mean scores of 3.38, 3.24, 3.36, 3.51 and 3.25 respectively impact mean performance scores of social studies students. The grand mean of 3.34 indicates that GM determines mean performance scores of tertiary institution students in social studies class in the study area.

Research Question 2: Does Google Maps (GM) determine mean interest score of tertiary institution students in social studies class?

Table 2: GM as a determinant of mean interest score of tertiary institution students in social studies class

S/N	GM and Mean Interest Score	Mean	SD	Remarks
6.	GM is a viable tool for retaining students' attention in social studies class.	3.24	0.82	Accepted
7.	GM makes students active participant in the learning process.	3.48	0.77	Accepted
8.	GM integrated class provides opportunity for students to master required technological knowledge.	3.36	0.75	Accepted
9.	Inclusion of GM triggers students' positive attitudes towards social studies lesson.	3.38	0.76	Accepted

10.	It helps students improve mapping skills and sustain interest in classroom activities.	3.36	0.83	Accepted
	Grand Mean	3.36	0.78	

Source: Field Study (2023).

Table 2 above reveals respondents opinions in respect to whether GM determine mean interest score of tertiary institution students in social studies class. Based on the table, the mean interest scores of 3.24, 3.48, 3.36, 3.38 and 3.36 including the grand mean of 3.36 are above the acceptance mean value of 2.5.

The scores from the table indicated that all items 6-10 impact on social students' interest after exposure to GM integrated classroom. The table revealed that GM is a viable tool for retaining students' attention in social studies class, GM makes students active participant in the learning process, GM integrated class provides opportunity for students to master required technological knowledge, inclusion of GM triggers students' positive attitudes towards social studies lesson as well as it helps students improve mapping skills and sustain interest in classroom activities with mean scores of 3.24, 3.48, 3.36, 3.38 and 3.36 respectively impact mean interest score of tertiary institution students in social studies class. The grand mean of 3.36 indicates that GM determine mean interest score of tertiary institution students in social studies class in the study area.

Research Question 3: Does Google Maps (GM) determine differences in mean performance scores of male and female tertiary institution students in social studies?

Table 3: GM as determinant of differences in mean performance scores of male and female tertiary institution students in social studies class

S/N	GM and Difference in Gender Mean Performance Score	Mean	SD	Remarks
11.	Social studies is a gender sensitive course.	3.29	0.84	Accepted
12.	Female students have lower self-efficacy in social studies class.	3.28	0.84	Accepted
13.	GM inclusion leads to students' academic improvement.	3.36	0.83	Accepted
14.	GM tool increases students' social skills	3.51	0.80	Accepted
15.	GM class enhances students' social content knowledge.	3.38	0.76	Accepted
	Grand Mean	3.36	0.81	

Source: Field Study (2023).

Table 3 above reveals the opinions of respondents in respect to whether GM determine differences in mean performance scores of male and female tertiary institution students in social studies GM class in the study area. Based on the table, the mean performance scores of 3.29, 3.28, 3.36, 3.51, and 3.38 including the grand mean of 3.36 are above the acceptance mean value of 2.5.

The scores from the table indicated that all items 11-15 impact on male and female social studies students' mean performance scores after exposure to GM integrated classroom. The table revealed that social studies is a gender sensitive course, female students have lower self-efficacy in social studies class, GM inclusion leads to students' academic improvement, GM tool increases students' social skills as well as GM class enhances students' social content knowledge with mean scores of 3.29, 3.28, 3.36, 3.51, and 3.38 respectively impact mean performance scores of male and female social studies students. The grand mean of 3.36 indicates that GM determine mean performance scores of male and female tertiary institution students in social studies class in the study area.

Testing of Research Hypotheses

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

Null Hypothesis One: Google Maps (GM) does not significantly determine mean performance score of tertiary institution students in social studies class.

Table 4: Chi-Square Table of GIS and Performance of Students in Social Studies class

Variables	N	Mean	Df	X²-Cal	P-Value	L-Sign
Google Maps	80	40.18	96	139.70	0.00	0.05
Social Studies Performance Test	80	20.45				

Source: Field Study (2023).

From table 4 above, the chi-square value (X²-Cal) is 139.70 at 96 degrees of freedom while P-Value is 0.00, which is less than 0.05 level of significance. Since X²-Cal (139.70) is greater than P-Value (0.00) at 0.05 level of significance, then the hypothesis that says Google Maps does not significantly determine mean performance score of tertiary institution students in social studies class is rejected. Therefore, Google Maps significantly determine mean performance score of tertiary institution students in social studies class.

Null Hypothesis Two: Google Maps (GM) does not significantly determine mean interest score of tertiary institution students in social studies class.

Table 5: Chi-Square table of GM and Interest of Students in Social Studies Class

Variables	N	Mean	Df	X ² -Cal	P-Value	L-Sign
Google Maps	80	42.68	96	153.72	0.00	0.05
Social Studies Interest Scale	80	26.15				

Source: Field Study (2023).

From table 5 above, the chi-square value (X²-Cal) is 153.72 at 96 degrees of freedom while P-Value is 0.00, which is less than 0.05 level of significance. Since X²-Cal (153.72) is greater than P-Value (0.00) at 0.05 level of significance, then the hypothesis that says Google Maps does not significantly determine mean interest of tertiary institution students in social studies class is rejected. Therefore, Google Maps significantly determine mean interest of tertiary institution students in social studies class.

Null Hypothesis Three: Google Maps (GM) does not significantly differentiate between mean performance scores of male and female tertiary institution students in social studies class.

Table 6: GM as determinant of differences in mean performance scores of male and female students in social studies class.

Google Maps	Gender	N	Mean	SD	df	t-test	P-Value	Sig
	Male	57	52.97	4.98				
	Female	23	46.01	4.05	164	0.49	0.68	0.05

Source: Field Study (2023).

Table 6 presents differences in mean performance scores of students exposed to GM class on the basis of gender. The table reveals T-test value (0.49) at 164 degrees of freedom while P-Value 0.68 is greater than 0.05 standard level of significance. Since T-test 0.49 is less than P-Value 0.68 at 0.05 level of significance, then the hypothesis that says there is Google Maps does not significantly differentiate between mean performance scores of male and female tertiary institution students in social studies class is retained. Therefore, Google Maps does not determine differences between mean performance scores of male and female tertiary institution students in social studies class in the study area.

Discussion of Findings

Hypothesis One: Google Maps (GM) does not significantly determine mean performance score of tertiary institution students in social studies class.

Evidences from table 4 revealed that X^2 -Cal of 139.70 at .000 P-value, which is less than 0.05 obtained level of significance at 96 degrees of freedom. In this sense, the hypothesis that says Google Maps does not significantly determine mean performance score of tertiary institution students in social studies class is rejected. Hence, Google Maps significantly determine mean performance scores of tertiary institution students in social studies class.

In agreement with the findings of this study, Baker (2012) reported that social studies students in this age prefer to be taught with technology such as Google Maps as against traditional method of paper work. Similarly, Demirci's study revealed that majority of respondents (61%) agree that GM helps with regard to visualizing or understanding social concepts thereby enhancing students' academic performance (Demirci, 2018). Also, the study is in agreement with Aarons (2013) in the studies involving two group designs noted that GM achieves higher scores than the control group, which often consists of students using conventional methods such as social maps or paper maps/atlas. In the same vein, the study agreed with West (2013) that working with GM improve the understanding of complex contents, interactions and processes both in the environment and the society, as well as systemic thinking and subject competencies thereby enhancing academic performance of students. In addition, the findings confirmed Cremer's report that frequent use of GM fosters a wide variety of skills and competencies such as methods competency, general computer and media literacy, spatial thinking skills and spatial/social awareness, map competency, personal responsibility, self-directed learning and social competency, critical thinking skills, (artistic) creativity and reading literacy. For this author, GM makes learning easier with inculcation of practical skills expected of social studies students in the modern age (Cremer, 2014). However, the study disagreed with Klein (2017) who reported that the percentage of students who understood nothing at all when using GM (58%) was the highest of all media included in the survey while additional 10.2% claimed bad understanding when using GM in social studies lesson.

Hypothesis Two: Google Maps (GM) does not significantly determine mean interest score of tertiary institution students in social studies class.

Evidences from table 4 revealed that X^2 -Cal of 153.72 at .000 P-value, which is less than 0.05 obtained level of significance at 96 degrees of freedom. In this sense, the hypothesis that says Google Maps does not significantly determine mean interest score of tertiary institution students in social studies class is rejected. Therefore, Google Maps significantly determine mean interest score of tertiary institution students in social studies class.

In agreement with current empirical study, Gungadeen (2015) reported that technology integrated lesson is a useful tool for retaining and sustaining students' attention in environment class like social studies. Similarly, Dalal (2016) reported that GM encourages students' participation in the learning process by guiding them to gather the necessary and important information, search for solutions to the problem and attain the right solution. In addition, the study agreed with Aladag (2015) who maintained that the introduction of GM in social studies class has a positive effect on students' attitudes and interests towards the lessons. The study affirmed that GM integrated lesson promoted academic success among high risk failure and low interest students in social studies. Also, the study concurred with Milson (2018) that GM is not only germane to retaining students' interests in social studies lessons but also provides students the opportunities to work with social data within their locality thereby calibrating their knowledge and interest in local environment.

Hypothesis Three: Google Maps (GM) does not significantly differentiate between mean performance scores of male and female tertiary institution students in social studies class.

Table 6 presents differences in mean performance scores of students exposed to GM class on the basis of gender. The table reveals T-test value (0.49) at 164 degrees of freedom while P-Value 0.68 is greater than 0.05 standard level of significance. Since T-test 0.49 is less than P-Value 0.68 at 0.05 level of significance, then the hypothesis that says Google Maps does not significantly determine differences in mean performance scores of male and female tertiary institution students in social studies class is retained. Thus Google Maps does not determine mean performance scores of male and female tertiary institution students in social studies class in the study area. In agreement with this study, Adeosun (2012) and Abdu-Raheem (2012) reported no significant difference in academic performance of male and female students in social studies. Also, the study agreed with Lee (2015) and Kinzel (2016) who revealed that improvement in performance or the post-test scores after GM treatment do not significantly differ between male and female students in social study assessment. On the contrary, this study disagreed with Hedges and Newell (2015) that in environmental science courses, male outperforms female but in reading and writing, female have the advantage. Similarly, the study disagreed with Suleiman (2014) who established significant difference in the academic performance of male and female students in favour of females in terms of comprehension of information, evaluation of arguments and CGPA.

Conclusion

Based on the research findings, it could be inferred that as far as tertiary institutions of learning in Taraba State is concerned, to a reasonable extent, Google Maps

significantly determine academic performance and interest of social studies students. In the course of this study, it was established that Google Maps tools are viable and needful instruments for attracting students' interest in the field of social studies and subsequently improve on their academic performance.

Recommendations

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

1. The management of tertiary institutions in Taraba State should consider Google Maps integration into environmental science department, especially in social studies cohort in order to enhance on students' academic performance and instill relevant modern skills expected of environmental scientists in the world of work.
2. Also, it is imperative for the HODs of various institutions to key into Google Maps lesson delivery so as to attract more students and sustain the interest of undergraduate in the field of social studies. Most especially now that studies have established that Google Maps tools are relevant for effective teaching-learning process in environmental science. In fact, lecturers are to be encouraged to judiciously use GM facilities to fascinate students' interest and permanent knowledge attained.
3. Lastly, inclusion of Google Maps in social studies class will help streamline gender stereotyping in environmental science courses as reported by some scholars. After all, the current study has revealed no difference in academic performance of social studies students taught in GM integration classroom. Hence, use of GM in social studies class will ensure balance of performance based on gender thereby increasing enrolment of female students into the field of social studies.

References

- Aarons, F. (2013). Concept Mapping in Science: A Case Study of Fifth Grade Students. *Educational Technology & Society*, 10 (1): 186-196.
- Abdu-Raheem, O. B. (2012). The influence of gender on secondary school students' academic performance in South-West, Nigeria. *Journal Social Science*, 31(1): 93-98
- Adeosun, O. V. (2012). Relative Effects of Three Multi-Media Packages on Students' Achievement and Retention in Social Studies. Ph.D. Thesis, Unpublished. University of Ado-Ekiti, Ado-Ekiti, Nigeria
- Akeju, O. & Rotimi, E. (2015). Internet-based science learning: A review of journal publications. *International Journal of Science Education*, 33(14), 1893–1925.
- Aladag, E. (2015). The effect of using geographic information systems in primary school 7th grade social studies lesson on students' academic achievement and motivation towards the lesson [Unpublished doctoral dissertation]. Gazi University, Ankara.
- Akintade, B. O. (2013). Considering the determinants of selecting geography as a discipline: the case of senior secondary school students in Ilorin. *Ozean Journal of Social sciences*, 5(1)
- Artvinli, E. (2013). Contribution of Geographical Information Systems (GIS) to geography teaching and secondary school students' attitudes towards GIS. *Educational Sciences: Theory & Practice*, 10(3), 1255- 1292
- Baker, T. (2012). The effects of GIS on student's attitudes, self-efficacy and achievement in middle school science classrooms. *Journal of Geography*, 102(6), 243-254
- Birbili, M. (2016). Mapping knowledge: Concept maps in early childhood education. *ECRP*, 8(2): 1-13.
- Clark, A. (2014). GIS pedagogy, web-based learning and student achievement. *Journal of Geography in Higher Education* 31 (2): 225-239.

- Cremer, M. (2014). Concept-Mapping in Primary Science. *Prime Areas*, 35 (3): 35- 39
- Dalal, D. (2016). Effects of reformulation of knowledge and expository teaching strategies on
- Demirci, A. (2013). The use of GIS in teaching Middle East Geography: An application for the 9th-grade Geography lesson. *Journal of National Education*, 44(203), 84-106.
- Fun, O. (2015). Geography teaching and the new technologies: Opportunities and challenges. *Journal of Education*, 181(3): 63-76.
- Gallenstein, L. D. (2013). Fostering geographic literacy from early childhood: The contributions of interdisciplinary research. *Journal of applied developmental psychology*, 15: 549-569.
- Gilbert, H. (2012). Gender and academic achievement of secondary school students in social studies in Abakaliki urban of Ebonyi State. *British Journal of Education*, 4(8), 72-83
- Gungadeen, R. (2015). Gender-related differences in spatial abilities. *Progress in Human Geography*, 16: 315-342.
- Hedges, L. V., & Nowell, A. (2015). Sex differences in mental test scores, variability and numbers of high scoring individuals. *Science*, 269 (5220), 41-45.
- Henry, B. (2016). Depth of processing and the quality of learning outcomes. *Instructional Science* 12: 49-58.
- ISTE (2018). Technology and student achievement—the indelible link: Policy Brief. Washington: International Society for Technology in Education. Retrieved April 4, 2011, from http://www.k12hsn.org/files/research/Technology/ISTE_policy_brief_student_achievement.pdf
- Kaya, H. (2012). The effect of Geographical Information Systems on student achievement in Secondary School Geography Education. *Marmara Geographical Journal*, (23), 308-326.
- Kerski, J. J. (2014). The implementation and effectiveness of geographic information systems technology and methods in secondary education. *Journal of Geography*, 102(3), 128-137.
- Kinzel, I. (2016). Current events and the Internet: Connecting —headline news to perennial issues. *Social Studies and the Young Learner*, 12(1), 25-28.
- Klein, P. (2017). Using inquiry to enhance the learning and appreciation of geography. *Journal of Geography*, 94 (2), 358-367.
- Krapp, D. (2012). . Reconsidering Research on Learning from Media. *Review of Educational Research*, 53(4), 445-459
- Kunter, I. (2012). . Media will never influence learning. *Educational Technology Research and Development*, 42(2), 21-29.
- Lee, P. J. (2015). “Understanding and research”. In A. K. Dickinson & P. J. Lee (Eds.), *History teaching and historical understanding* (pp.94-120). London: Heinemann Educational Books.
- Ling, B., & Boo, I. (2013). Bridge21—exploring the potential to foster intrinsic student motivation through a team-based, technology-mediated learning model. *Technology, Pedagogy and Education*, 25(2), 187-206.
- Milson, A. J. (2018). Where and why there? Spatial thinking with geographic information systems. *Social education*, 73(3), 113-118.
- Molenda, R. (2014). Impact of teaching through concept mapping on achievement in social studies’ components. *International indexed & refereed research journal*, 4 (46): 54-57.
- Nadeem, M. (2011). Teacher competencies and factors affecting the performance of female teachers in Bahawal, Pakistan retrieved on 20th January 2016 from www.ijbssnet.com
- Njoku, C. (2014). “Primary School Teachers’ Perception of the Problems of Girls in Learning Science”. In: O. Busari (Ed.): *Women in Science, Technology and Mathematics Education in Nigeria. 43rd Annual Conference Proceedings*, STAN. Rivers State, Nigeria, University of Technology, August, 2014: 18-23
- Oppong, J. R., & Ofori-Amoah, B. (2012). “Ghana: Prospects for Secondary School GIS Education in a Developing Country”. In A. D. Andrew J. Milson (Ed.), *International perspectives on teaching and learning with GIS in secondary schools* (pp. 115-123). New York: Springer
- Popoola, I. (2012). Predictors of digital competence in 7th grade: a multilevel analysis. *Journal of computer assisted learning*, 7(11); 101-115
- Shaibu, A. M. (2014). Gender related difference in the understanding of science process skills among junior secondary school students in some Nigerian schools. *Journal of Science and Technology Association, Niger*, 32(1, 2), 21-28.
- Suleiman, T. (2014). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15 (2), 4-14.
- West, B. A. (2013). Student attitudes and the impact of GIS on thinking skills and motivation. *J. Geog. High. Educ.* 102, 267–274.