



# Journal of Tertiary Education and Learning (JTEL)

ISSN: 2994-4015 (ONLINE)

VOLUME 3 ISSUE 1 (2025)



PUBLISHED BY  
E-PALLI PUBLISHERS, DELAWARE, USA

## Impact of Gender Differences on Academic Achievement and Interest in Regional Geography among Secondary Schools in Dala, Kano, Nigeria

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### Article Information

**Received:** August 03, 2024

**Accepted:** September 09, 2024

**Published:** February 13, 2025

### Keywords

*Academic Achievement, Gender Differences, Regional Geography*

### ABSTRACT

This study investigates the impact of gender differences on academic achievement and interest in regional geography among secondary school students in the Dala Education Zone, Kano State, Nigeria. The research utilizes a quasi-experimental design, involving a pretest and post-test non-equivalent control group design. The population of the study comprises 3,653 SS II Geography students in secondary schools within the Dala Zonal Education, Kano State, selected through a purposive stratified sampling technique. The study explores potential gender disparities in academic achievement and interest levels when students are taught regional geography using concept mapping. The findings reveal that there is no significant gender difference in academic achievement and interest levels among students using concept mapping as a teaching strategy. The interactive and visual nature of concept mapping enhances learning outcomes and student interest in regional geography, providing a valuable tool for educators to improve teaching practices and promote active engagement among students.

### INTRODUCTION

Geography, as a fundamental component of science education, involves the study of people in diverse geographical locations and their daily activities such as agriculture, mining, fishing, and trade (Iwena, 2014). It examines specific geographic entities like continents, countries, states, and local communities, as well as physical elements of the Earth such as rocks, mountains, oceans, climate, and vegetation (Iwena, 2012). Geography entails spatial analysis of locations, environmental features, human interactions, and regional characteristics (Bello, 2013). The dynamic nature of geography is highlighted by its evolution from descriptive approaches to highly analytical methodologies, incorporating advanced tools like Geographic Information System (GIS), Remote Sensing, and Global Positioning System (GPS) (Njoku, 2008).

Regional geography, as a subfield of geography, focuses on the study of specific land areas with common natural or artificial attributes (Rashid, 2012). In the context of Nigeria, regional geography encompasses aspects such as agriculture, transportation, industries, and commercial activities, offering a comprehensive understanding of the country's geographic features and socio-economic dynamics. Nigeria, located in the central part of Africa, is bordered by Niger to the North, Benin Republic to the West, Cameroon to the East, and the Atlantic Ocean to the South (Bello, 2013). With a total land area of approximately 923,768 square kilometers and a population of 140 million as of the 2006 census, Nigeria represents a significant geographic entity in the African continent (Iwena, 2012).

Kpolovie (2014) defines academic achievement as the ability of students to comprehend and communicate knowledge effectively, both orally and in written form. It

reflects the acquisition of knowledge, skills, and attitudes through educational experiences (Arokoyu, 2017).

While Interest, as a psychological state of engagement and predisposition to engage repeatedly in specific ideas or subjects, plays a vital role in shaping students' learning experiences (Paul, 2014). In the context of geography education, fostering students' interest through student-centered approaches like concept mapping can enhance academic achievement and engagement.

Research indicates that gender disparities persist in science education, impacting social, economic, and educational development. Factors contributing to gender disparities include opportunity costs, early marriage among girls, lack of female role models, self-concept issues, teaching methods, and gender stereotypes (Offer, 2007).

Geography educators, stakeholders, and organizations have expressed deep concern over the alarming poor performance of Geography candidates in examinations conducted by WAEC, NECO, and GCE (WAEC, 2007; Sakiyo & Waziri, 2015; Muhammad, 2019). Various contributing factors have been identified behind this trend, including the ineffectiveness of teachers, the quality and nature of teaching methods employed, the shortage of adequately trained Geography teachers, the broad coverage of subjects, and students' attitudes towards the subject (Tshibalo, 2003; Mangal, 2009; Okoro & Ejeh, 2009; Ahmad, 2013). These factors collectively contribute to the ongoing poor academic achievement of students in Geography.

The table below shows a summary trend of poor academic performance in Geography which necessitated a focused investigation into the methods utilized for teaching and learning Geography and their influence on students' academic achievements. The need for such

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a study is underscored by the continuous decline in the performance of Geography students in examinations, as evidenced by the data collected from WAEC in Kano State for the years 2012 to 2018 (WAEC Registrars

Report, 2012-2018). The data shows a consistent pattern of low pass rates and high failure rates among Geography students, reflecting a systemic issue that warrants urgent attention and intervention.

**Table 1:** Geography students' achievement trend in WAEC and SSCE result in public schools 2012 to 2018

S/N	Year	Number of student registered	Number of student passed (A1-C6)	Percentage passed (%)	Number of student failed (D7-F9)	Percentage failed (%)
1	2012	3830	1149	30	2681	70
2	2013	3730	1772	48	1958	52
3	2014	3643	1457	40	2186	60
4	2015	3805	1979	52	1826	48
5	2016	3757	1841	49	1916	51
6	2017	3660	1574	43	2086	57
7	2018	3054	1404	46	1649	54

Source; (WAEC registrars report 2012-2018)

The study provided a comprehensive overview of the significance of geography education as a distinct discipline within science education. It highlighted the dynamic nature of geography, the role of academic achievement in student success, the diverse teaching methodologies employed by geography educators, and the importance of fostering student interest through innovative approaches like concept mapping. The research addressed a research gap by investigating the effect of gender differences on academic achievement and interest in Regional Geography among secondary school students in the Dala Education Zone, Kano State.

### Objectives of the Study

The study examined the impact of gender differences on the academic achievement and interest in regional geography among secondary school students in the Dala Education Zone, Kano State, Nigeria. The specific objectives guiding the research are as follows:

1. To explore potential gender differences in academic achievement among students in regional geography taught using concept mapping within the Dala Education Zone, Kano State.
2. To analyze potential gender differences in the level of interest between male and female students when instructed in regional geography through concept mapping in the Secondary Schools of the Dala Education Zone, Kano State.

### Significance of the Study

The research holds significant implications for both academia and educational practice in the context of regional geography instruction among secondary school students in the Dala Education Zone, Kano State, Nigeria. The importance of this study can be summarized as follows:

1. The outcomes of this research have the potential to inform curriculum development efforts, particularly in the field of geography education. By identifying variations

in academic achievement and interest levels between different teaching methods, educators and curriculum developers can make data-driven decisions to enhance the quality and relevance of geography instruction.

2. Educators and teachers stand to benefit from the insights generated by the study. Understanding the comparative effectiveness of concept mapping versus conventional teaching methods can empower educators to make informed choices in selecting instructional strategies that best support student learning and engagement in regional geography.

3. The findings of this research can serve as a basis for evidence-based policy initiatives aimed at improving the quality of geography education in secondary schools. Policy-makers and educational stakeholders can use the research outcomes to advocate for pedagogical approaches that are more responsive to the needs and learning preferences of students in the Dala Education Zone and beyond.

### Theoretical Framework

#### Social Cognitive Theory (Bandura, 1986)

The theoretical formulation of this research work is based on the Social Cognitive Theory, proposed by Albert Bandura, which emphasizes the role of observational learning, imitation, and modeling in shaping behavior. In the context of this study, Social Cognitive Theory can help explain how gender differences impact academic achievement and interest in regional geography. It suggests that individuals learn through observing others and that environmental factors, personal factors, and behavior all interact and influence each other. Gender disparities in academic performance and interest may be influenced by factors such as self-concept issues, teaching methods, and societal expectations, which align with the principles of Social Cognitive Theory.

This study investigated how the application of concept mapping as an instructional approach can enhance students' comprehension, retention, and interest

in regional geography. By employing principles of meaningful learning and cognitive structure integration, the research seek to contribute to the educational strategies that promote effective learning outcomes among secondary school students in Dala Education Zone and provide a scholarly basis for exploring the effectiveness of concept mapping teaching on academic achievement and interest in regional geography. By leveraging the principles of meaningful learning and cognitive structure assimilation, the research provided valuable insights into the pedagogical approaches that can optimize students' learning experiences in the geographical domain.

**MATERIALS AND METHODS**

The study employed Quasi-experimental design involving pretest and post-test non-equivalent control group design. Nworgo (2006) indicate that quasi experiment is an experiment where randomization of subject of experimental and control groups is not possible. Intact classes were used as sample that lasted for six (6) weeks after separation of the groups into experimental and control groups. Both experimental and control groups receive a pre-test (01), the pretest was administered to determine the level of achievement of students, treatment is conducted and also to determine their equivalence. The experimental group was taught the Regional Geography of Nigeria (transportation and communication and

manufacturing industries using a concept mapping teaching strategy, while the control group was taught the same concept using the concept mapping teaching strategy while the control group were taught same concept using conventional method. Both groups were subjected to a post-test. Questionnaire on interest was also administered before and after the treatment.

The population of the study comprises 3,653 SS II Geography students in secondary schools within the Dala Zonal Education, Kano state. This selection of SS II students was purposeful, considering their stage in the educational system and their level of engagement compared to SS III students and SS I students. Dala Zonal Education encompasses forty senior secondary schools in two local governments, namely Dala and Gwale. Geography being an elective course, only thirty secondary schools are included in the population (NPE, 2013).

A stratified sampling technique was employed to select SS II classes from boys' and girls' schools within the Dala Zonal Education, ensuring representation of both sexes, due to the study's focus on gender differences in academic achievement and interest in regional geography. By stratifying the sample based on gender, the research accounts for potential variations that may exist between male and female students in their response to the concept mapping teaching strategy. The schools selected as sample size for the study are shown in the table below.

**Table 2:** Sample size showing the experiment and control SS II classes (noting geography is elective)

S/N	Group	Name of School	Sex	No. of S.S II Intact Class
1	Experimental	G.S.S Dala	Male	45
2	Control	G.G.C Dala	Female	40
3	Experimental	G.G.S.S Dukawuya	Female	50
4	Control	G.S.S Goron Dutse	Male	50

Source: Dala Zonal Education Office (2018)

**RESULTS AND DISCUSSION**

The data for this study were scores obtained on the effect of gender differences on students' academic achievement and interest among senior secondary school students in Dala Zonal Education Directorate of Kano State,

Nigeria. It was to determine the difference in the mean scores of students exposed to concept mapping teaching strategy and those taught using conventional teaching method. The summary of the results are presented in the table below:

**Table 3:** Distributions of respondents by group and gender

Groups	Frequency	Percentage (%)
Concept Mapping	95	51.4%
Conventional	90	48.6%
<b>Gender</b>		
Male	95	51.4%
Female	90	48.6%

The table above presented the distribution of respondents by various groups in which mapping teaching strategy has the total number of 95 respondents representing 51.4% and conventional has 90 respondents representing 48.6%, with regard to the distribution of respondents. Based on gender, the table shows that there are 95

male respondents representing 51.4% and 90 female respondents representing 48.6%. The descriptive statistics also revealed that male students have the high number of the respondents than the female counterpart based on the number of intact class of geography students from the selected schools.

A statistical analysis obtained using the SPSS of the data collected which formed the basis of the findings of the study, to present a clear and logical data analysis, descriptive statistics inform of mean and standard deviation for achieving the specific objectives and inferential statistics, inform of t-test for independent samples for testing all

the hypotheses at 0.05 level of significance. To achieve the specific objective guiding the research, To explore potential gender differences in academic achievement among students in regional geography taught using concept mapping within the Dala Education Zone, Kano State.

**Table 4:** Mean achievement scores of Male and Female students taught Regional Geography using Concept Mapping Teaching Strategy

Gender	N	Mean	S.D	M.D
Male	45	19.75	2.99	0.9
Female	50	18.88	2.84	

Source: - field work (2021)

The table shows the academic achievement mean scores of the respondents based on gender difference. The descriptive statistics revealed that male respondents have the mean scores of 19.75 with standard deviation of 2.99 while female students have the mean score of 18.88 and standard deviation of 2.84. Therefore, the difference in the mean achievement score of male and that of the female respondents is statistically significant,

this indicate that male and female respondents taught regional Geography using concept mapping teaching strategy does not differ in academic achievement. Also achieve the second specific objective, To analyze potential gender differences in the level of interest between male and female students when instructed in regional geography through concept mapping in the Secondary Schools of the Dala Education Zone, Kano State.

**Table 5:** Mean interest score of Male and Female students taught Regional Geography using Concept Mapping Teaching Strategy

Gender	N	Mean	S.D	M.D
Male	45	67.82	10.17	1.2
Female	50	66.62	9.68	

The table above shows the mean scores of male and female respondents taught with concept mapping teaching strategy in which male student has the mean scores of 67.82 and standard deviation of 10.17 while female respondents has the mean scores of 66.62 and the standard deviation of 9.68, with mean difference of 1.2. Therefore, the difference in the mean score of male and that of the female respondents is not statistically significant, this indicate that gender difference is insignificant however, slight in favour of male counterpart.

**Hypotheses Testing**

Based on the objectives of the study two hypotheses were formulated and tested at 0.05 level of significance, using t -test for independent samples.

**HO<sub>1</sub>**

There is no significant difference in the mean academic achievement of male and female when taught Regional geography using concept mapping.

**Table 6:** t-test for independent samples in the mean academic achievement of male and female students taught Regional geography using Concept Mapping

	Gender	N	Mean	SD	t-value	Df	P-Value	Decision
Gender	Male	45	19.75	2.99	1.462	93	.147	Accepted
	Female	50	18.88	2.84				

The table presents the result for independent t-test of geography students in academic achievement between male and female students taught Regional geography using Concept Mapping. The result shows that insignificant difference was found in academic achievement of geography students between male and female students taught Regional geography using concept (t = 1.462, Df = 93, P = .147). Therefore, the null hypothesis is accepted and it is concluded

that there is no significance gender difference in the mean of academic achievement of male and female students taught Regional geography using concept mapping.

**HO<sub>2</sub>**

There is no gender difference in the interest between male and female students taught Regional geography using concept mapping.

**Table 7:** t-test for independent samples in the interest of male and female Geography students taught Regional geography using Concept Mapping

	Gender	N	Mean	SD	t-value	Df	P-Value	Decision
Posttest Interest	Male	45	67.82	10.17	.590	93	.557	Accepted
	Female	50	66.62	9.68				

The table presents the result for independent t-test in the level of interest between male and female when taught Regional geography using concept mapping. The result shows that insignificant difference was found in the level of interest between male and female students taught Regional geography using concept mapping indicated ( $t = .590$ ,  $Df = 93$ ,  $P = .557$ ). Therefore, the null hypothesis is accepted and it is concluded that there is no significant difference in the level of interest between male and female taught Regional geography using concept mapping.

**Discussions**

The first finding shows a significant difference in academic achievement between male and female students using the Concept Mapping strategy it suggests that the teaching method is equally beneficial for both genders. This finding aligns with the notion that Concept Mapping can be a gender-neutral instructional strategy that caters to diverse learning styles and preferences. The finding is in line with Social Cognitive Theory suggests that individuals learn through observation and modeling. In this context, the interactive and visual nature of Concept Mapping could have positively influenced both male and female students’ academic achievement by catering to diverse learning styles. This outcome aligns with the theory as it underscores the role of the learning environment in shaping students’ behavior and performance. The second finding revealed that Students taught Regional Geography using Concept Mapping showed a higher interest level compared to those taught using Conventional Teaching However there was no significant gender difference in the interest level between male and female students using the Concept Mapping strategy. The lack of significant gender difference in interest level between male and female students using the Concept Mapping strategy indicates that both genders responded similarly to the interactive and engaging nature of the teaching approach. This suggests that Concept Mapping was successful in capturing the interest of students regardless of gender, promoting active engagement in the learning process. This finding is in line with the Social Cognitive Theory which emphasizes environmental factors and modeling in shaping behavior. The engagement and active participation encouraged by the Concept Mapping strategy may have led to increased interest levels irrespective of gender, aligning with the theory’s focus on observational learning and environmental influences.

**CONCLUSION**

It is clear from the findings of this study that, the use of concept mapping strategy in teaching geography in

senior secondary schools has an impact on the student’s academic achievements and their interest level. Therefore, the use of concept mapping strategy should be made by teachers in secondary schools in Dala Educational zone, Kano state.

The following conclusions were drawn;

1. There was no significant gender difference in academic achievement and interest levels among students using Concept Mapping;
2. The interactive and visual nature of Concept Mapping enhances learning outcomes and student interest in the regional geography, providing a valuable tool for educators to improve teaching practices and promote active engagement among students.

**RECOMMENDATIONS**

Base on the findings of this study, the following recommendations are made;

- i. Educators should receive training on how to effectively implement Concept Mapping in the classroom to maximize its benefits for students.
- ii. Educators should strive to develop teaching methodologies that cater to the diverse learning needs and preferences of both male and female students.
- iii. Schools and policymakers should emphasize the use of active learning strategies, such as Concept Mapping, to foster student-centered learning environments and improve educational outcomes.

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