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EFFECTS OF FIELDWORK ON STUDENTS ACHIEVEMENT IN GEOGRAPHY IN ABIA STATE

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Abstract: *The study investigated effect of Field Work on Students' Achievement in Geography in Abia State. The study was guided by two research questions and two hypotheses. A quasi-experimental research design was adopted for the study. The population of the study comprised 1,883 Senior Secondary III (SS3) students offering Geography in Abia State, from which a sample of 57 SS3 Geography students was selected using a multistage sampling procedure. Urban Land Use Map Reading Geography Achievement Test (ULMGAT) was instrument for data collection. The reliability of ULMGAT was established using the Kuder-Richardson 20 (KR-20), which yielded a reliability coefficient of 0.88. Data collected were analysed using mean, standard deviation and ANCOVA for research questions and hypotheses. The findings revealed that students taught Map Reading using Field Work Method recorded the highest achievement, than those taught using Lecture Method, with a statistically significant difference between the groups. No significant difference was found between the achievement of male and female students' taught map reading using Field Work Method. The study concluded that Field Work Method was the most effective instructional approach for teaching map reading than Lecture Method. It was therefore recommended that Geography teachers should incorporate Field Work approaches more extensively in teaching Map Reading to promote active participation, practical learning and improved learning outcomes among students.*
Keywords: *Field work, Students and Academic Achievement Geography*

Introduction

Geography is a branch of science that focuses on the systematic study of the Earth's surface, its physical features, natural processes, human activities, and the interactions between people and their environment. The term *geography*, which literally means "description of the Earth," encompasses the study of places, landscapes, inhabitants, and the various phenomena occurring on the Earth's surface. According to Anyanwu (2018), Geography is concerned with understanding the spatial processes and patterns that shape the environment and influence human activities.

The importance of Geography to national development cannot be overemphasized, as the subject provides learners with knowledge and skills necessary for understanding their physical and human environments. Through the study of Geography, students develop critical thinking, observation, inquiry, problem-solving, and environmental awareness skills. The subject also enables learners to understand important relationships among the Earth, Sun, Moon, atmosphere, landforms, climate, natural resources, and human activities. Such knowledge is essential for addressing contemporary environmental and developmental challenges. Geography also occupies an important position within the Nigerian educational system. The National Policy on Education recognizes Geography as an important school subject that can be offered by students in both the science and arts disciplines (Okezie, 2018). Its interdisciplinary nature makes it relevant to various fields of human endeavour, including environmental management, agriculture, urban and regional planning, transportation, resource management, and sustainable development.

Geography helps learners develop a deeper understanding of their surroundings and the processes influencing human and environmental development. Consequently, effective teaching and learning of Geography at the secondary school level is essential for equipping students with the knowledge, skills, and attitudes required to participate meaningfully in national development and promote sustainable interaction with the environment. At the secondary school level, geography stands on a tripod. The three sub-divisions are physical Geography, human and regional geography as well as map work. These sub-divisions are interrelated. Physical geography deals with the natural environment while human and regional geography address issues which directly relate to human activities (Amosun & Oderinde, 2020).

Map work on the other hand, deals with the representation on paper and analysis of selected geographical information which may be physical or human and regional.

The importance of map reading in the National development cannot be overemphasized as it forms the basis of understanding of the subject geography. Maps aid the achievement of the objectives of Geography as it is a convenient inventory of selected information made available for immediate visual inspection, in the form of exact locations and spatial patterns which are manifestations of a variety of relationships (Ofomata, 2018). Okoro (2020), went further to state that the studying of map reading aid in the understanding of the concepts of differential character and spatial relationships of the features on the earth's surface, understand the concept of man-environment relations, develop in students the ability to appreciate the problems and peculiarities of other people, develop critical thinking ability in the students and develop in the students the skills and techniques for accurate, orderly and objective geographical investigation.

Contemporarily, maps are used in almost every field of human endeavours. For instance, they are used in transportation, tourism, town planning, census, military, economic planning among others. Thus Ehrenberg (2020) posits that the uses of a map depend on the type of map and the information it contains. Simple maps contain few information and little or no map reading skills are required to use it. Complex maps according to Ovenden (2021) demand some basic map reading skills on map interpretation as they may contain the exact location of many land form features, actual distance, elevation, vegetation, political divisions, drainage features, cultural features, land use patterns and so on. It is also noted that topographic map also known as a general reference map because of the variety of information it represents, is the map type use for the O' level geography examinations. Okonkwo (2021) holds that topographic maps show natural features, artificial features, cultural features and political boundaries of a part of the earth's surface. Topographic maps are differentiated from other maps in that they show both the horizontal and vertical positions of the terrain (Martin & Thompson, 2018).

Map reading is the analysis of the representations on a map using the signs and symbols. Therefore, the understanding of the content of a map is dependent on the ability to recognize and interpret the symbols on the map. Map reading is an aspect of the geography curriculum in secondary education. It is taught mostly at the secondary school in Senior Secondary I-2 units. It is imperative to highlight that the map reading section of the O' level geography examinations presents one and the only compulsory question of the examinations.

Despite the significance of interpretation of topographic map features in geography studies show that interpretation of topographic map features is the most difficult section of geography for students (Adetumberu, 2022). It has also been found that many students fear geography because of interpretation of topographic map features and that affects the students' achievement in map reading. Oyeieke (2024) in his study of Oranmiyan Local Government Area of Oyo State reported that 62% of senior secondary school students, feared Geography because of interpretation of topographic map features. The "WAEC" Chief Examiners' and Moderators' reports (WAEC, 2022) revealed that the candidates would have performed better had it not been for the poor performance in the interpretation of topographic map features section of the subject. The reports stated that in spite of good performance of some candidates, they scored low marks because they were poor in map interpretation. Some studies such as (Okpala, 2019 & Falaye, 2021), have identified poor instructional methodology as a major reason why students find interpretation of topographic map features difficult. The poor instructional methodology appears to be associated with the conventional lecture method of learning. In a survey of teachers' methods of teaching Interpretation of topographic map features in Nigeria secondary schools, Arowosegbe (2022) reported that the method of teaching predominately use for teaching interpretation of topographic map features in the lesson they observed was lecture and note or text book dictation. The conventional lecture method of teaching has its advantages and disadvantages. However, the persistent poor academic performance of students in the interpretation of topographic map features may be associated with the continued reliance on conventional lecture methods of teaching. Although the lecture method remains widely used because of its simplicity and convenience, its predominantly teacher-centred nature may provide limited opportunities for students to interact directly with geographical features and apply map-

reading concepts to real-life situations. Studies by Usman (2019) and Bichi (2022) have criticized the monotonous use of conventional teaching methods, particularly where effective learning requires active participation and practical experiences. This situation suggests the need for instructional approaches that can make the teaching and learning of map work more practical, meaningful, and learner-centred. One instructional approach that may address this challenge is fieldwork or field trips. Fieldwork provides students with opportunities to move beyond classroom explanations and observe geographical phenomena in their natural or real-world settings. In the teaching of map work, for instance, fieldwork can enable learners to relate physical landforms and other geographical features represented symbolically on a topographic map to the actual features on the ground. Through such direct experiences, students may develop a better understanding of map symbols, contours, relief features, direction, scale, and the relationship between map representation and the physical environment. Thus, the use of fieldwork may provide learners with practical experiences that can enhance their understanding and achievement in map reading.

The relevance of fieldwork to students' learning can be further understood in relation to academic achievement. Achino (2019) defines academic achievement as the level of an individual's performance in a test in comparison with the performance of others at the same educational level. Similarly, Saka *et al.* (2021) conceptualize academic achievement as the extent to which learners develop skills and knowledge through specific instruction or training, with emphasis on the degree to which stated instructional objectives have been attained. In the context of this study, academic achievement refers to the level of students' performance in map-reading tasks following instruction. Therefore, an instructional method that provides students with opportunities to observe, explore, and practically apply geographical concepts may contribute to improved academic achievement. It is against this background that fieldwork is considered relevant to the teaching and learning of map reading in this study.

Fieldwork can provide students with first-hand experiences of physical landforms and other geographical features that are represented in abstract form on maps. Rather than learning map features solely through classroom explanations, students can observe the corresponding features in their actual environment and subsequently relate their observations to their map representations. This practical connection between classroom knowledge and real-world geographical features may make map-reading concepts more concrete, understandable, and memorable to learners.

Field trips, which are closely related to fieldwork, are commonly described as instructional trips, school excursions, or school journeys undertaken for educational purposes. In the context of this study, a field trip refers to a planned school or class excursion designed to expose students to geographical features and situations outside the classroom, thereby enabling them to establish an experiential connection between classroom concepts and real-world phenomena. Maguire (2022) describe fieldwork as students' experiences outside the classroom at interactive locations designed for educational purposes. Consequently, when properly planned and integrated with classroom instruction, fieldwork can provide learners with opportunities to observe geographical features directly, participate actively in the learning process, and apply map-reading knowledge to real environmental situations. It is therefore necessary to empirically investigate the effectiveness of fieldwork in enhancing students' academic achievement in map reading and gender differences.

Gender is an important learner characteristic that may influence students' participation, experiences and achievement in Geography. It refers to the socially constructed roles, behaviours, expectations and relationships associated with males and females. In Geography education, gender may become relevant because the subject involves practical and outdoor activities such as observation, measurement, map reading, environmental investigation and fieldwork. Fieldwork provides opportunities for both male and female students to interact directly with geographical phenomena, collect data and apply classroom knowledge to real-life situations. When equal opportunities for participation are provided, fieldwork can promote active learning and potentially improve the achievement of students irrespective of gender (Maguire, 2022).

Empirical studies have produced mixed findings on gender and achievement in Geography and field-based learning. Falaye (2021) found no significant gender difference in students' achievement in Practical Geography, while Filgona et al. (2021) similarly reported that gender did not significantly affect students' achievement when hands-on learning was used in topographical map studies. Filgona and Sababa (2022), however, found that female students performed better than male students under mastery learning and reported a significant interaction between instructional treatment and gender. More recently, Arabi (2026) reported that gender had no significant effect on students' achievement when field-trip strategy was used in Geography in Adamawa State. These findings suggest that gender may not independently determine Geography achievement and that its influence may depend on the instructional strategy, learning environment and context in which learning occurs.

Despite these studies, a gap remains in the literature regarding the effects of fieldwork on Geography achievement with particular attention to gender among secondary school students in Abia State. Most existing studies have been conducted outside Abia State or have examined other instructional strategies and subjects rather than geographical fieldwork specifically. The inconsistent findings on whether male and female students benefit equally from practical and field-based learning also justify further investigation. Therefore, the present study sought to close this contextual and empirical gap by determining whether fieldwork produces significant differences in the achievement of male and female Geography students in Abia State.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of students in Map-reading taught using field work and lecture method in Abia State?
2. What are the mean achievement scores of male and female students in Map-reading taught using field work method in Abia State?

Hypotheses

The following null hypotheses are formulated to guide the study and were tested at 0.05 level of significance:

HO_1: There is no significant difference among the mean achievement scores of students taught Map-reading using field work and lecture method in Senior Secondary Schools in Abia State

HO_2: There is no significant difference between the mean achievement scores of male and female students taught Map-reading using field work method in Abia State

Methodology

This study adopted quasi- experimental research design. Specifically, pretest, treatment and post test non – randomized control group design. The study was carried out in Abia State with population of one thousand eight hundred and eight three (1883) Senior Secondary three (SS3) school students offering geography in Abia State. Senor secondary 3 students were used because having completed two years geography (SS1-SS2) in physical and human geography aspects, they were considered to have mastered some concepts which are fundamental to the study of Map Reading in Senior Secondary three. The sample for this study was 57 SS3 Geography students. Multistage sampling procedure was used to select the sample for the study. Firstly, one out of the three Education zones of Abia State (i.e Aba, Umuahia and Ohafia) was randomly selected. Hence, Umuahia education zone was sampled. Secondly, three schools were randomly selected from Umuahia education zone. Two schools were used for experimental groups, while one was used for the control group. SS3 classes were purposively selected because map work in SS 3 scheme of work. Instrument used for data collection was urban land use map reading Geography Achievement test (ULMGAT). The Achievement Test is a multiple-choice test items adapted from past WAEC and NECO question paper 2020-2025 which covers the concepts of land use aspect of map reading unit of Geography. The achievement test (ULMGAT) is a 50-item multiple choice with four multiple options. Face and content validity were established for urban land use map reading Geography Achievement test (ULMGAT). The urban land use map reading Geography Achievement test (ULMGAT) was subjected to trial testing. The scores obtained from the trial testing were subjected

to reliability test using Kuder Richardson 20 (KR_{20}) test statistics with reliability index of 0.88. The researcher used three research assistants for data collection. The research assistants with the researcher administered the pre-test and posttest test to the students. At first the pretest was administered to the students before treatment. At the end of the treatment, the instrument was reshuffled and re-administered to the students as posttest. One hour was allowed for the test. The test was marked by the researcher using marking guide, scores were collated.

Experimental procedure

The researcher through the teachers informs local authorities / property owners, parents / guardians to take students out for fieldwork within the selected study area. After approval is granted, a risk assessment is conducted to identify possible hazards, and safety measures are clearly explained to the students. The researcher through the teachers prepares the necessary materials, including topographic maps of the area, compasses, measuring tapes or trundle wheels, protractors, notebooks, pencils, and clipboards. Prior to the field visit, students are introduced in the classroom to the basic elements of a map such as the title, scale, legend or key, compass direction, and grid reference system. They are taught how to calculate distances using scale, measure bearings with a protractor, interpret contour lines, and identify conventional symbols representing physical and human features. The teacher distributes maps to the students and leads them to the selected area. At the site, the first activity involves orienting the map correctly by using a compass to locate north and aligning the map with the surrounding landscape. Students then identify prominent landmarks such as roads, buildings, rivers, hills, or other visible features and match them with their corresponding symbols on the map. As they move around the area, they verify whether the mapped features correspond accurately to what exists on the ground and record their observations in their notebooks.

Next, students practice measuring distance by selecting two identifiable landmarks. They measure the actual ground distance using a measuring tape or trundle wheel and then measure the same distance on the map using a ruler. By applying the map scale, they calculate the real distance and compare it with the measured ground distance, noting any differences. The teacher then guides students in determining direction and bearings by identifying a feature, measuring its bearing in the field using a compass, and comparing it with the bearing measured on the map using a protractor.

Students also practice locating features using four-figure and six-figure grid references, confirming their positions physically in the field. For areas with varied relief, students observe slopes and landforms and relate them to contour patterns on the map, noting how closely spaced contours indicate steep slopes while widely spaced contours indicate gentle slopes. During the exercise, students draw a simple sketch map of the area, ensuring they include essential elements such as a title, key, north arrow, and scale.

After completing the field observations, the students return to the classroom where they analyze their findings. They discuss the accuracy of the map in representing the real environment, identify any discrepancies such as new structures not shown on the map, and calculate any measurement errors observed during the exercise. Finally, each student prepares a structured fieldwork report outlining the objectives, procedures, findings, calculations, and conclusions.

For the control group, the research assistant administered the treatment using conventional method of teaching. This was done in the normal classroom setting. The teaching was based on conventional approach where the teacher presenting the lectures and the students remained passive listeners. Although the lesson was conducted according to the lesson plan designed for the conventional lecture method of teaching Data gathered from the field using the research instrument was analyzed in line with each research questions and hypotheses. Mean and standard deviation was used to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. For decision rule purposes, the null hypothesis is rejected if p-value (Sig.) is less than 0.05 ($p < 0.05$) otherwise, it is accepted.

Results and Analysis

The results of the descriptive and inferential analyses were presented as follows:

Table 1: Mean and standard deviation achievement scores of students in Map-reading taught using field work and lecture method

		Pretest		Posttest		
Method	**N**	$\bar{X}$	**SD**	$\bar{X}$	**SD**	**Mean gain scores**
FWM	27	35.50	6.73	75.10	5.24	39.60
LM	30	30.32	3.36	57.70	4.54	27.38

Where, $\bar{X}$ = mean, SD= Standard deviation, , FWM= field work method, LM= lecture method.

Table 1 presents the mean and standard deviation of the pretest and posttest academic achievement scores of students in Map-reading taught using field work method (FWM) and lecture method (LM) in Abia State. The results show that students taught using FWM obtained the highest posttest mean achievement score of 75.10 with standard deviation of 5.24, improving from a pretest mean of 35.50 and standard deviation of 6.73 with the highest mean gain score of 39.60. Students taught using the Lecture Method (LM) had a posttest mean achievement score of 57.70 with standard deviation of 4.54, increasing from a pretest mean of 30.32 and standard deviation of 3.36 with the lowest mean gain score of 27.38. The two instructional strategies improved students' academic achievement in Map reading. However, Field work method (FWM) produced the highest improvement in achievement, than the Lecture Method (LM).

Table 2: Analysis of covariance (ANCOVA) of mean achievement scores of students taught Map reading using field work and lecture method in Senior Secondary Schools

Source	**Type III Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Corrected	5360.504 [a]	3	1786.835	65.005	.000
Intercept	9697.152	1	8482.276	352.781	.000
Pretest	3.183	1	3.813	.139	.710
***Strategies**	4648.873	2	2324.436	**84.563**	**.000**
Error	2776.258	54	27.488		
Total	466177.000	57			
Corrected Total	8136.762	56			

a .R Squared=.659 (Adjusted R Squared=.649)

Table 2 presents the Analysis of Covariance (ANCOVA) of the mean achievement scores of students taught Map reading using field work and lecture method in Senior Secondary Schools. The result revealed that there was a statistically significant difference in the mean achievement scores of Geography students taught Map reading using the two instructional methods, as indicated by the calculated F-value of 84.563 with a corresponding probability value (Sig. = .000), which is less than the alpha level of 0.05. This indicates that the instructional methods significantly influenced students' achievement in Map reading. Since the significance value (.000) is less than the 0.05 level of significance, the null hypothesis which stated that there is no significant difference in the mean achievement scores of students taught Map reading using field work and lecture method was rejected. Inference drawn is that there was significant difference in the mean achievement scores of students taught Map reading using field work and lecture method in Senior Secondary Schools.

Table 3: Mean and standard deviation achievement scores of male and female students in Map-reading taught using field work method

FWM		**Pretest**		**Posttest**		
Gender	**n**	$\bar{X}$	**SD**	$\bar{X}$	**SD**	**Mean gain scores**

Male	16	30.12	4.03	67.87	6.71	37.75
Female	11	29.26	4.27	67.78	5.28	38.52
Effect						0.77

Where n= Number of respondents, $\bar{X}$= mean, SD= Standard deviation, FWM=Field work method

Table 3 presents the mean and standard deviation of the pretest and posttest academic achievement scores of male and female students in Map-reading taught using field work method. The results show that male students had a pretest mean achievement score of 30.12 with standard deviation of 4.03 and a posttest mean of 67.87 and standard deviation of 6.71, resulting in a mean gain score of 37.75. Female students recorded a pretest mean of 29.26 with standard deviation of 4.27 and a posttest mean of 67.78 and standard deviation of 5.28, with a mean gain score of 38.52. The effect size (mean gain difference) between the two groups was 0.77 in favour of the female students. This indicates that both male and female students showed substantial improvement in academic achievement when taught Map reading using Field work method, with female students demonstrating a slightly higher achievement gain than their male counterparts.

Table 4: Analysis of covariance (ANCOVA) of mean academic achievement scores of male and female students taught Map-reading using field work method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected	.113 [a]	2	.056	.002	.998
Intercept	2913.658	1	2913.658	79.091	.000
Pretest	.049	1	.049	.001	.971
***Gender**	.052	1	.052	**.001**	**.970**
Error	1178.859	24	36.839		
Total	162204.000	27			
Corrected Total	1178.971	26			

a .R Squared=.000 (Adjusted R Squared=.062)

Table 4. presents the Analysis of Covariance (ANCOVA) of the mean achievement scores of male and female students taught Map-reading using field work method. The result revealed that there was no statistically significant difference in the mean achievement scores of male and female students taught Map-reading using field work method , as indicated by the calculated F-value of .001 with a corresponding probability value (Sig. = .970), which is greater than the alpha level of 0.05. This indicates that gender did not significantly influence students' achievement scores when taught Map reading using Filed work method. Since the significance value (.970) is greater than the 0.05 level of significance, the null hypothesis which stated that there is no significant difference in the mean achievement scores of male and female students taught Map-reading using field work method was accepted. Inference drawn is that there was no significant difference in the mean achievement scores of male and female students taught Map-reading using field work method in Abia State

Discussion of findings

The result of the study was discussed according to the research questions and the corresponding hypotheses a follow.

The finding revealed that students taught Map Reading using the Field Work Method achieved the highest scores, than students taught field work using Lecture Method. The difference among the three groups was statistically significant, with the advantage favouring fieldwork. This finding demonstrates that the instructional method employed in teaching Map Reading can substantially influence students' academic achievement. The finding is consistent with Oyeleke, (2024), who reported that students valued fieldwork because it enhanced their understanding of geographical subjects and real-world environments. The Nigerian study by Arabi (2026) also found that fieldwork enhance students achievement Geography. The present finding therefore strengthens the argument that fieldwork has particular advantages for a practical and spatially oriented topic such as Map Reading.

The finding indicated that male and female students taught Map Reading using the Field Work Method both recorded substantial improvements in academic achievement and benefited almost equally from the method. The test of hypothesis showed that there was no significant difference between the academic achievement scores of male and female students exposed to fieldwork. This finding suggests that fieldwork provided comparable learning opportunities for both genders. The result is educationally significant because Map Reading involves practical skills that can be developed through direct participation rather than through reliance on gender-related characteristics. Falaye (2021) reported no effect of gender on fieldwork motivation among a large sample of geography students, suggesting that gender does not necessarily determine students' willingness to engage in field-based learning. In addition, Filgona, et.al; (2021) found that fieldwork enhanced students' understanding by giving them direct experience of geographical environments and processes. However, this finding contrast with Maguire (2022), who found a significant difference in achievement between male and female students taught Geography through a fieldtrip strategy, favouring male students. This contradictory evidence is important because it demonstrates that fieldwork does not automatically guarantee gender-equitable outcomes. Therefore, the present finding may be interpreted as evidence that when fieldwork is carefully planned and male and female students are given equal opportunities to observe, practise, manipulate materials, interpret information and report findings, comparable achievement can be obtained.

Recommendations

Based on the findings and educational implications of the study, the following recommendations are made:

1. Geography teachers should adopt Field Work Method regularly in teaching Map Reading.
2. Geography teachers should ensure equal participation of male and female students in instructional activities.
3. School administrators should provide adequate resources for fieldwork activities.
4. Government and relevant educational agencies should organize regular professional development programmes for Geography teachers.
5. Teacher education institutions should strengthen the preparation of prospective Geography teachers in innovative instructional methods.

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