



Perceived Difficult Map Reading and Interpretation among Senior Secondary School Geography Students in Katagum Education Zone, Bauchi State-Nigeria

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Abstract

The study investigated the perception of difficulties in map use among Senior Secondary Geography students, in Katagum Education Zone, Bauchi State, Nigeria. The study was guided by two research questions and two null hypotheses. Descriptive and ex-post facto survey research design were adopted for the study. The population of the study comprised of 11064 Senior Secondary School (SS3) Geography Students (7191 males and 3873 females) in the all government owned senior secondary schools in Katagum Education Zone of Bauchi State during 2020/2021 academic session. The sample size of the study comprises of 386 Senior Secondary three (SS3) students drawn using multi-stage sampling procedure. The instrument for data collection was Geography Difficulty Identification Questionnaire (GDIQ). The instrument was validated by three experts from the Department of Social Science Education, University of Nigeria, Nsukka. An overall reliability coefficient of 0.72 for the instrument was ascertained using Cronbach Alpha. The data collected for the research questions was analyzed using descriptive analysis (mean and standard deviation). The t-test was used to test the hypotheses at $p < 0.05$ level of significance. The findings of the study revealed that the school location and gender are not a significant factor in determining specific difficulties encountered in map reading and interpretation in geography. Based on these findings, recommendations were made.

Keywords: Geography, Difficulties, Map Reading and Interpretation

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Introduction

Any nation, country or state came into existence in attempts to give conclusion about the complexity of the world. These attempts unveil the existing knowledge about people and their environment through the study of geography. It studies all the three aspects of earth namely the lithosphere, hydrosphere and atmosphere (Iwena, 2015). The Australian Curriculum Assessment and Reporting Authority (ACARA, 2011) asserts that geography potentially assists cross-disciplinary learning and helps students to recognize the connections between geography and other fields of study or specialization. Students of Geography are able to know about the natural conditions of the whole country, its climate, vegetation, natural resources and its mineral wealth (Mitchell, Brysch, & Collins,

2015; Dolan, 2016). This clearly indicates the practical values of geography. However, despite the importance of geography amongst students, most of the student's experience difficulties while studying geography. Students, parents, teachers, government and the societies are worried because of poor achievement of students in geography. The West African Examinations Council (WAEC) chief examiners' reports on students' performance analysis shows poor performance of students in geography from 2016 to 2018. To this end, the study of physical structure and inhabitants of the earth in particular region or terrain poses difficulties in learning due to inherent nature of the content.

Learning difficulties is a disorder in which a person needs much effort to learn effectively, caused by an unknown factor or



factors that affect the brain's ability to receive and process information (Akinoso, 2014). Learning difficulty can be due to learner's inabilities as malfunction to comprehend a concept and content given in a specific curriculum (Khardewsaw, 2013). According to World Health Organization (WHO, 2010), specific learning difficulties consist of basic reading, spelling and arithmetic problems (F81, that is Specific developmental disorders of scholastic skills). Learning difficulty causes individuals to experience problems in a usual classroom learning context.

Furthermore, learning difficulties that serve as constraints to students are believed to be as a result of hereditary, factors (such as, drugs abuse, syrups or cocaine use during pregnancy), medical factors (premature birth, diabetes, meningitis of mother or offspring), and environmental factors (malnutrition, poor prenatal healthcare) (Grodzinsky, 2018). Horowitz, (2018) argued that learning difficulties are not caused by economic weaknesses, environmental influences, or cultural variations, but as a result of heredity. Often learning difficulties occur in the family due to harms during pregnancy and birth. Learning difficulties according to Patino, (2014) might occur by sickness or injury during or prior to birth, incidents after birth, head injuries, nutritional deprivation, and exposure to poisonous substances by the parents or individuals. Therefore, learning difficulties are constraints that predispose senior secondary school students to perceive the geographical concept as difficult. These difficulties may occur in various concepts of geography to students during learning such as map reading and interpretation.

Map reading is the process of identifying features on a map by using symbols and signs or names and map interpretation is the interpretation of symbols and signs used on map into ordinary language to indicate the features they represent and draw logical conclusions from the information as represented by the symbols (Edwinmasai, 2017). Map symbols may be lines, colors, shapes, or pictures. To explain the symbols, maps use keys, also known as legends, which show the symbol with an explanation next to it. Symbols represent human and physical characteristics (Hirsch, 2017).

Some maps are so common that a child would recognize them, while others are used only by professionals in specialized fields. Some of the most common types are political, physical, topographic, climate, economic, and thematic maps (Amanda, 2020). Fisher, Frey and Hattie, (2016) suggest that the use of mapping is most effective when it is used as a tool for students to show their thinking and to organize what they know. In other words, a map should not be considered an end-product; rather, it is an intermediate step that students can use to complete another task. Amosun, (2016) state that Scholars have started to read different meanings to the difficulties students encountered in map reading and interpretation. Map therefore is the representation of reality of a place on a sheet of paper or any material and reading and interpretation is the explanation of the contents of a map of different location. Despite the important of map reading and interpretation, some students tend to find it difficult to understand. Thus the present study investigated on the level of difficulties students encountered on the concepts.

Purpose of the Study

This study is undertaken to investigate students' perception of difficulties encountered in secondary geography. The study intends to determine:

1. the specific difficulties perceived by male and female students in map reading and interpretation.
2. the specific difficulties perceived by urban and rural students in map reading and interpretation.

Research Questions

The following questions guided the study:

1. What are the specific difficulties perceived by male and female students in map reading and interpretation?
2. What are the specific difficulties perceived by urban and rural students in map reading and interpretation?

Hypotheses

The following null hypotheses guided the study.

1. The specific difficulties perceived by students in map reading and



- interpretation do not depend significantly on gender ($p < 0.05$).
- The specific difficulties perceived by students in map reading and interpretation do not depend significantly on location ($p < 0.05$).

Methodology

Two research designs were adopted for the study, descriptive survey and ex-post facto research designs. According to Nworgu (2015), descriptive survey research design involves collecting data on and describing in a systematic manner, the characteristics, features or facts about a given population. This particular design was adopted for the study because of the researcher's interest in collecting and describing some relevant data with respect to students' perceptions of difficulties encountered in map reading and interpretation. Besides, ex-post facto research design was adopted since the influences of variables such as gender, and school location that cannot be manipulated were investigated. According to Nworgu (2015), ex-post facto design is a research design which is used to study the influence of variables that cannot be manipulated (i.e. non-manipulative independent variables). The population of the study comprised all the 11064 School (SS3) Geography Students of 2020/2021 academic session (i.e. 7191 males & 3873 females) in all (53) public senior secondary schools in Katagum Education Zone of Bauchi State that offers Geography. The distribution of the population from urban schools follows thus; Katagum Local Government (4796 students- 2938 males & 1858 females), Jama'are Local Government (1609 students- 1102 males & 507 females), Shira Local Government (1207 students 706 males & 501 females), and from rural schools; Giade Local Government (788 students- 520 males & 268 females), Itas-Gadau Local Government (748 students- 435 males & 313 females), Gamawa Local Government (1242 students- 1122 males & 120 females), and Zaki Local Government (674 students- 368 males and 306 females) (KZEO, 2019). The choice of SS3 students is because they have covered the contents of SS1 and SS2 as well as undergoing SS3 scheme of work, and also the students might have learned the fundamentals of geographic studies.

The sample size of the study comprised of 386 Senior Secondary three (SS3) students drawn from the population through the proportionate stratified sampling technique. The sample size was determined using Taro Yamane's formula. Multi-stage sampling procedure was used in composing the sample. At the first stage, purposive sampling technique was used to select 36 schools from the 53 schools in the seven Local Government Areas (LGA) used for the study. The reason for the choice of purposive sampling is that the seven LGA have co-educational schools, (i.e. boys and girls schools). At the end, the following number of schools was emerged, namely; 12- Katagum, 6- Jama'are, 6- Shira, 4- Giade, 3- Itas-Gadau, 2- Gamawa, and 3- Zaki LGA. This gives a total of 36 schools. In the second stage, simple random sampling technique by balloting with replacement was used to draw (2) schools from each LGA, making a total number of fourteen 14 schools. Simple random sampling technique was used in order to give every school equal chance of being selected for the study. Thirdly, proportionate stratified random sampling was used to select students used in each school sampled, resulting to the total number of 386 (268 Male and 118 Female) students.

The instrument used for data collection was a questionnaire titled; "Geography Difficulty Identification Questionnaire" (GDIQ) constructed by the researcher from the new Geography curriculum of senior secondary school and content of the study. The instrument has two sections: A, and B. Section A of the (GDIQ) is on bio-data information; sections B consist of a cluster. The cluster draws out information on difficulties in map reading and interpretation and comprised of 10 questionnaire items, and structured in 4-point rating scales of Very Difficulty (VD), Difficulty (D), Easy (E), and Very Easy. The instrument was validated by three experts from Department of Social Science Education, University of Nigeria Nsukka. Cronbach Alpha formula (α) was used to obtain reliability index because the instrument was non-dichotomous scored which yielded 0.72 reliability coefficient. The instrument for data collection was administered to the



Mustapha, S., Sampson, M., Aliyu H. D. & Unwuzurike U. A. ©2022 Federal University of Kashere. Respondents with the help of research assistants in each of the sampled school. All the research questions were answered using mean and standard deviation. The benchmark for interpreting the mean scores was based on the class limits of real numbers i.e. Very Difficulty = 3.45-4.00, Difficulty = 2.45-3.44, Easy = 1.45-2.44 and Very Easy = 0.50-1.44. The t-test was used to test the hypotheses at 0.05 level of significance. The decision rule for accepting null hypotheses was based on p-value. Any null hypothesis that its p-value is greater than 0.05 level of significance were accepted while any null hypothesis that its p-value is less than 0.05 level of significance were rejected.

Results

Table 1: Mean and standard deviation of the ratings of male and female students on their specific difficulties perceived in map reading and interpretation N=386

S/N	Item Statement	Gender	Mean	SD	Remarks
1	Interpreting map scales	Male	3.13	1.01	Difficulty
		Female	3.08	.93	Difficulty
2	Identifying water bodies on maps	Male	2.94	.95	Difficulty
		Female	2.85	.84	Difficulty
3	Identifying vegetation features on maps	Male	2.79	.89	Difficulty
		Female	2.91	.86	Difficulty
4	Identifying landforms on maps	Male	2.74	.93	Difficulty
		Female	2.72	.94	Difficulty
5	Interpreting lines of communication	Male	2.67	1.03	Difficulty
		Female	2.61	.96	Difficulty
6	Identifying trigonometry station on maps	Male	2.72	1.01	Difficulty
		Female	2.66	1.02	Difficulty
7	Identifying land use types	Male	2.59	1.07	Difficulty
		Female	2.62	1.05	Difficulty
8	Identifying true north on map	Male	2.53	1.08	Difficulty
		Female	2.59	1.02	Difficulty
9	Interpreting contour patterns	Male	2.78	1.03	Difficulty
		Female	2.86	.92	Difficulty
10	Identifying the colors used to represent features on map	Male	2.63	1.01	Difficulty
		Female	2.75	1.02	Difficulty
Grand Mean		Male	2.75	1.00	Difficulty
		Female	2.77	0.96	Difficulty

NB: N = Number of respondents; SD = Standard deviation

Table 1 shows the mean score of male and female students on their specific difficulties perceived in map reading and interpretation, from the results as shown in the table, the response of both gender falls within the range of “difficult” because their response falls within the mean scores of 2.45-3.44. This means that majority of the respondents’ perceived map reading and interpretation as

difficult. However, the overall mean ratings of 2.75 and 2.77 for the male and female students respectively indicate that female students had higher mean rating than their male counterparts.

Ho₁: The specific difficulties perceived by students in map reading and interpretation do not depend significantly on gender (p < 0.05).

Table 2: t-test on specific difficulties perceived in Map Reading Interpretation in Geography

Gender	N	Mean	SD	Df	t	Sig	Decision
Male	268	2.73	1.00	38	0.10	0.55	Accepted
Female	118	2.77	.96				

n = number of male and female respondents; SD = standard deviation; df = degree of freedom; t = t-test value; Sig = probability value.



Table 2 revealed that the probability associated with the calculated t (0.10) for the difference in the mean ratings of male and female students on their specific difficulties perceived in map reading and interpretation in geography is 0.55. Since the probability value of 0.55 is greater than the 0.05 level of

significance, the null hypothesis was not rejected. This implies that there is no significant difference in the mean ratings of male and female students on the specific difficulties perceived in map reading and interpretation in geography in favour of the rating of female students.

Table 3: Mean and standard deviation of the ratings of urban and rural students on their specific difficulties perceived in map reading and interpretation N=386

S/N		Location	Mean	S.D	Remarks
1	Interpreting map scales	Urban	2.90	1.06	Difficulty
		Rural	3.46	.73	Very Difficulty
2	Identifying water bodies on maps	Urban	2.70	.94	Difficulty
		Rural	3.23	.78	Difficulty
3	Identifying vegetation features on maps	Urban	2.69	.92	Difficulty
		Rural	3.05	.75	Difficulty
4	Identifying landforms on maps	Urban	2.62	.98	Difficulty
		Rural	2.91	.83	Difficulty
5	Interpreting lines of communication	Urban	2.57	1.07	Difficulty
		Rural	2.79	.89	Difficulty
6	Identifying trigonometry station on maps	Urban	2.65	1.06	Difficulty
		Rural	2.79	.93	Difficulty
7	Identifying land use types	Urban	2.46	1.06	Difficulty
		Rural	2.82	1.02	Difficulty
8	Identifying true north on map	Urban	2.41	1.08	Easy
		Rural	2.77	.99	Difficulty
9	Interpreting contour patterns	Urban	2.84	1.02	Difficulty
		Rural	2.76	.97	Difficulty
10	Identifying the colors used to represent features on map	Urban	2.59	1.04	Difficulty
		Rural	2.79	.97	Difficulty
Grand Mean		Urban	2.64	1.02	Difficulty
		Rural	2.93	0.88	Difficulty

NB: N = Number of respondents; SD = Standard deviation

Table 3 shows the mean score of urban and rural students on their specific difficulties perceived in map reading and interpretation, from the results as shown in the table, the response of both rural and urban students on items 2,3,4,5,6,7,9 & 10 falls within the range of “difficult” because their response falls within the mean scores of 2.45-3.44. Although, there exist disparity in the decision of rural students on item 1 which the response falls within the mean scores of 3.45-4.00 indicated that the item is “very difficult” and also another disparity occurred on item 8 where the decision of urban

students falls within 1.45-2.44 which indicated that the item is “Easy”. This means that majority of the respondents’ perceived map reading and interpretation as difficult. However, the overall mean ratings of 2.64 and 2.93 for the urban and rural students respectively reveal that rural students had higher mean rating than their urban counterparts did.

Ho₂: The specific difficulties perceived by students in map reading and interpretation do not depend significantly on location (p< 0.05).



Table 4: t-test of urban and rural students on the specific difficulties perceived in map reading and interpretation

School Location	N	Mean	SD	Df	T	Sig	Decision
Urban	268	2.64	1.02	38	3.10	0.00	Rejected
Rural	118	2.93	0.88				

NB: n = number of male and female respondents; SD = standard deviation; df = degree of freedom; t = t-test value; Sig = probability value.

Analysis in Table 4 shows that the probability associated with the calculated t (3.10) for the difference in the mean ratings of male and female students on their specific difficulties perceived in map reading and interpretation 0.00. Since the probability value of 0.00 is less than 0.05 level of significance, the null hypothesis was rejected. This means that there is a significant difference in the mean ratings of male and female students on the specific difficulties perceived in map reading and interpretation in favour of the rating of rural students.

Discussion of Findings

The findings of the study revealed that female students had higher mean rating than their male counterparts on their specific difficulties encountered in map reading and interpretation. This could be as a result of little or no calculations and technical activities involve in map reading and its interpretation. Thus, the analysis showed that there is no significant difference in the mean ratings of male and female students on the specific difficulties encountered in map reading and interpretation in geography in favor of the rating of female students.

Okereafor (2011) found that among the 13 concepts in map work investigated, students had difficulty in 5 and that there was no significant difference in the achievement between male and female students. This finding is in agreement with the present finding. Also, the finding is in consonance with the finding of Falode, Usman, Ilobeneke, Mohammed, Godwin, and Jimoh (2016), who revealed that there was no significant difference between the attitude of male and female students exposed to the package.

On the contrary, the findings of this study do not agree with that of Larangeira, and van der Merwe (2016). They studied on map

literacy and spatial cognition challenges for student geography teachers in South Africa and observed that some geography students in high school still struggle to manipulate and decode the 2-dimensional map information from topographic maps as their spatial literacy was inadequately developed through the practice and teaching of map skills in a structured and standardized manner especially male students at secondary school level.

On the other hand, finding revealed that rural students had higher mean rating than their urban counterparts did on their specific difficulties encountered in map reading and interpretation. Thus, there is no significant difference in the mean ratings of rural and urban students on the specific difficulties encountered in map reading and interpretation in geography in favour of the rating of rural students.

Akinwumi, and Olaitan, (2017) conducted a study on effects of gender and school location on the Ekiti state secondary school's students' achievement in reading comprehension in English language. The study showed that there was no significant difference in the achievement of males and females between the experimental and control group. The study found that students in urban schools performed better than the rural schools in reading comprehension, inferring word meanings between the experimental and control groups. This finding is in agreement with the present finding. Also, the finding is in agreement with the finding of Frederick (2011), who revealed that there was no significant difference between urban and rural students exposed to the determining the influence of sex and school location on students' achievement in Agricultural science among senior secondary one (SS I) students in Enugu state.



On the contrary, the findings of this study do not agree with that of Owoeye and Yara (2011) who carried out a study on school location and academic achievement of secondary school students. The results showed that there is significant difference between students' academic achievement of rural and urban secondary schools in senior school certificate examinations. Thus, the study revealed that students in urban areas had better academic achievement than their rural counterparts.

Recommendations

Based on the findings the following recommendations were made:

1. Introduction of geography and map reading in primary and junior secondary schools is desired.
2. School authorities should always make request of map reading equipment into geography laboratories to enhance students understanding.
3. Time allocation for map reading practical should be reconsidered by the government to add more time to it.

Conclusion

Based on the findings of the study and discussion that follows, the following conclusion were made, thus; gender is not a significant factor in determining specific difficulties encountered in map reading and interpretation in geography. Also, school location is not a significant factor in determining specific difficulties encountered in map reading and interpretation in geography.

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