IMPACT ON SOME TEACHER VARIABLES ON STUDENT ASSESSMENT OF DIFFICULTY LEVELS IN GEOGRAPHY

Folajogun, V. Falaye, PhD
Institute of Education, University of Ibadan, Nigeria

Abstract

This study investigated the impact of some teacher characteristics as well as students' gender and their course area on how students assessed the difficulty levels of Geography topics. A sample of 928 students in their final year made up of 471 female and 457 male from 24 co-educational schools was involved in the study. The study reveals that students found Physical Geography easiest, followed by Human Geography. Even though Practical Geography was placed in the third position, Elementary Surveying, an aspect of Practical Geography was rated most difficult among all the 22 topics that constitute the Nigerian Secondary School Geography. Unexpectedly, some aspects of Regional Geography of Nigeria and Geography of Africa were rated difficult. While students' subject area, teachers' qualification and teaching experience significantly influenced students' assessment of topic difficulty in Geography, both student and teacher gender did not influence their ratings. These findings suggest that effective methods for teaching Geography topics need to be utilized for improved student learning.

Background

Until quite recently, Geography has been one of the most dreaded secondary school subjects in Nigeria. Enrolment and performance in public examinations conducted by the West African Examinations Council (WAEC) declined most especially in the 80s. Many students perceived that Geography is overloaded and difficulty to cover adequately, hence, students' poor performance in the subject. Policy change and its attendant curriculum review limited the teaching of Geography to the Senior Secondary School level with three years duration (FGN, NPE, 1998 and 2004).

This further heightened teachers' concern about content coverage and students' perception of the difficult nature of the subject. Nonetheless, Geography became a somewhat popular optional subject as a result of its grouping under non-vocational electives. Every student must take a maximum of two subjects from a list of 16 non-vocational elective subjects, and specifically, at least one subject from Literature-in-English, History, Geography or Religious Studies in addition to five (5) core subjects to make up a minimum of seven (7) or a maximum of eight (8) subjects to be offered in the Senior Secondary Certificate Examinations (SSCE) conducted by the WAEC.

Rather than select other subjects within the group of non-vocational subjects most students with Science background and some with interest in commercial subjects opt for Geography as an elective subject; only very few Art students select Geography as an option in the first year of the 3 year Senior Secondary School. By the final year of the Senior Secondary School, almost all Art students would have dropped Geography, which the National Policy on Education allows. It is unclear what factors drive the students' choice. This study is interested in finding out how students rate the difficulty levels of the subject.

Related Literature

Although research on the assessment of the difficulty levels of school subjects seems to be scarce especially in Humanities and the Social Sciences, it is however more in the Sciences and Mathematics (Fadare, 2001: Onabanjo, 1999; Oyedeji, 1996 & WAEC, 1995,

1997). Weeden (2007 & 2008) observed that at age 14, students perceived Geography as a popular optional subject in England and Wales. By 2006 the numbers entering for the General Certificate of Secondary Education (GCSE) examination declined by 29.4%. This is contrary to the increasing students' enrolment for Geography in SSCE in Nigeria. Onabanjo (1999) investigated students' perception of topic difficulty in Mathematics, in which over 50% of students perceived Trigonometry and Practical Geometry as the most difficult topics in the Senior Secondary Mathematics syllabus.

Fadare (2001) assessed the difficulty level of Physics items constructed by the WAEC and the National Examinations Council (NECO), a recently established national public examining body in Nigeria. Findings reveal that the WAEC Physics items are more difficulty than NECO items. In addition, the difference in difficulty is sensitive to gender with girls judging Physics items more difficult than boys. Perhaps, in an attempt to obtain informative feedback from its major stakeholders, WAEC has conducted a few researches to find out students', teachers' and experts' perceptions of the difficulty of Senior Secondary Certificate Examination essay questions in Mathematics, Chemistry and English Language.

With a total of 287 respondents comprising 260 students, 15 teachers and 12 experts, most students ranked questions in the three subjects as either of medium or high difficulty on a 3-point scale of hard, medium and easy. However, the ranking by teachers and other experts is incongruous. They ranked the items as either easy or of medium difficulty respectively (WAEC, 1995).

In another study, WAEC investigated both students' and teachers' perception of difficulty level of topics in Further Mathematics syllabus. The findings reveal agreement between teachers' and students' perceptions of difficulty level of Further Mathematics topics. Again, the perception varies between male and female students (WAEC, 1997). Aside gender influence in the variation observed in perceptions of difficulty levels of Secondary School subjects reported in these studies, it is believed that students' subject area and some teacher factors may interact to influence the way students perceive the difficulty levels of their school subjects.

Teacher variables presumed to influence students' assessment pattern include teacher effectiveness and gender. Although, teacher effectiveness can be defined by a number of measures, teacher qualification and teaching experience are believed to be very potent. Research suggests that a substantial portion of the difference in student learning is attributable to teachers; therefore, students' perception of difficulty levels in their school subjects can be a presumed function of teacher effectiveness augmented by the student factor. Findings from studies of the effects of teacher experience on students' learning have not been consistent.

Many studies have established that inexperienced teachers are less effective than experienced teachers. Others found that the relationship between teaching experience and students' achievement may not necessarily be positive. For example, Fetler (1999) found a strong negative relationship between average student scores and the percentage of teachers on emergency certificates, while Rosenholtz (1986) argued that the advantages of experience may even out after some years. A plausible reason given for this observed trend is that teachers' growth in experience does not always go hand in hand with advancement in effectiveness. Some experienced teachers seem to grow tired and lose interest in their job with time (Rosenholtz, 1986).

Further still, the benefits of teaching experience many interact with other factors. For instance, on one hand, it is when experienced teachers are given opportunities for further learning and collaboration that they are more likely to improve their teaching effectiveness (Rosenholtz, 1984). On the other hand, teachers with less years of experience can be highly effective if well prepared (Andrew & Schwib, 1995 and Denton & Peters, 1988). These

researchers seem to underscore the dimensions of teacher preparation, qualification and on-the-job-training as prerequisites for teacher effectiveness other than teaching experience.

Studies of student achievement at the secondary school level have established a substantial impact of teachers' qualifications on students' learning outcomes (Ferguson, 1991; Ferguson & Ladd, 1996; Fetier, 1999 & Goldhaber & Brewer, 1999). It is with this background that the study examines the level of difficulty of secondary school Geography using students' assessment. It also examines ways in which students' gender, subject area as well as some teacher factors as measured by gender, qualification and experience influence students' assessment of levels of difficulty of secondary school Geography.

Research Questions

The research addressed six questions:

1. What is the pattern of students' assessment of difficulty levels of Senior Secondary School (SSS) Geography topics?
2. Is there a significant difference in the assessment of difficulty levels of SSS Geography topics by male and female students?
3. Will the students' subject area significantly affect their assessment of difficulty levels of SSS Geography topics?
4. Does teacher's gender have a significant effect on students' assessment of difficulty levels of SSS Geography topics?
5. Does a teacher's qualification have a significant effect on the way students assess difficulty levels of SSS Geography?
6. Will Geography teachers' teaching experience significantly affect students' assessment of difficulty levels of Geography topics?

Method

Sample

The study sample consisted of nine hundred and twenty-eight (928) SS 3 students made up of 471 female and 457 male. They were drawn from the South-West Zone of Nigeria. Twenty-four (24) schools, four from each state that make up the zone (Ondo, Ogun, Oyo, Osun, Ekiti and Lagos states) were involved in the study. Schools with less than two Geography teachers were excluded from the research because the investigator believed that one teacher cannot effectively cover the Senior Secondary Certificate Examination (SSCE) Geography Syllabus. This may affect students' assessment. Another eligibility criterion was the content coverage at the time of data collection. The data were collected two weeks preceding the SSCE examination. Only schools where the syllabus had been covered were involved in the study. It is believed that without these eligibility criteria, students' assessment would not be objective. Cluster sampling technique was used to select students from the eligible schools.

Instruments

Two instruments designed by the investigator were used for data collection. The first instrument consisted of two sections. Section A sought information on respondents' demographics, while Section B consisted of a comprehensive list of topics in SSCE Geography syllabus (WAEC, 2004-2008). Students rated the levels of difficulty of twenty two (22) Geography topics on a four-point Likert scale of Very Easy, Easy, Difficult and Very Difficult. The second instrument was the Geography Teacher Questionnaire, which sought information on the teacher's background. The instruments were validated using expert judgement.

Procedure

Research assistants were trained to collect data from the participating schools. The assistants were informed of the purpose of the study, trained in procedure to select sample schools and students based on the eligibility criteria. To solicit for school principals' permission to use their schools, and enlist their support, copies of a letter addressing the nature, purpose, sample and duration of the study were given to the research assistants. One assistant was assigned to each of the six states that participated in the research.

Data Analysis

The data collected were analysed using simple descriptive statistics – frequencies and percentages and inferential statistics – t-test and ANOVA.

Results

Research Question 1: What is the Pattern of Students' Assessment of Difficulty Levels of Senior Secondary School (SSS) Geography Topics?

Among the topics that constitute Practical Geography, students seem to find elementary surveying most difficult. About 239 (25.8%) students rated the topic very difficult, while 436 (47.0%) found it difficult. Graphical representation of statistical data seems to be the easiest among the three topics that make up Practical Geography. A total of 597 (64.3%) rated it easy, while 568 (61.2%) similarly, found map reading and interpretation easy.

Generally, Geography students seem to find topics in Physical Geography relatively easy. Over 70% of students rated all the topics in this section easy, except the aspects of environmental interaction and oceans where 39.3% and 33.5% respectively rated the topic difficult. A similar pattern could also be observed in Human Geography. By students' rating, human Geography topics were easy, however 38.2% and 35.4% rated world trade and manufacturing industries difficult respectively. Surprisingly, the Regional Geography of Nigeria (45.1%); Africa on broad outlines (56.6%) and selected topics in Africa (46.3%) were rated difficulty by the students (Table 1).

Table 1: Pattern of Students' Assessment of Difficulty Levels of Geography Topics

Item	VE	E	D	VD
1. Map work/map reading and interpretation	196 (21.1)	372 (40.1)	227 (24.5)	133 (14.3)
2. Elementary surveying: Chain and prismatic compass, open and closed traverse	74 (8.0)	179 (19.3)	239 (25.8)	436 (47.0)
3. Graphical representation of statistical data, e.g. bar graphs, pie charts, dot maps/isopleths map	248 (26.7)	349 (37.6)	194 (20.9)	137 (14.8)
4. The earth as a planet in relation to the sun: structure of the earth, latitude, longitude and time	434 (46.8)	387 (41.7)	71 (7.7)	36 (3.8)
5. Rocks: Types, characteristics, formation and uses	512 (55.2)	328 (35.3)	52 (5.6)	36 (3.4)
6. Major landforms: Mountains, plateaus, plains, karsts and coastal landforms	284 (30.6)	430 (46.3)	165 (17.8)	49 (5.3)
7. Agents of Landforms: Weathering, running water, underground water, wind and waves	339 (36.5)	415 (44.7)	131 (14.2)	43 (4.6)
8. Oceans: Ocean basins, salinity, ocean current (causes, types and effects and effect on the climates of coastlands)	215 (23.2)	402 (43.3)	222 (23.9)	89 (9.6)
9. Weather and Climates: Uses of basic weather instruments, e.g. rain gauge, thermometer, barometer and wind vane	429 (46.2)	391 (42.2)	81 (8.7)	27 (2.9)
10. Elements of climate: Temperature, pressure, wind, land and sea breeze, classification of climate; types of climate	406 (43.8)	380 ()40.9	100 (10.8)	42 (4.5)
11. Soils: Types and characteristics, process of soil formation and soil profile	453 (48.8)	380 (40.9)	56 (6.1)	39 (4.2)

12. Vegetation: Major types of vegetation; tropical rainforest, cool temperature woodland, etc. characteristics distribution, etc.	258 (27.8)	421 (45.3)	187 (20.2)	62 (6.7)
13. Aspects of environmental interaction: Land ecosystem, environmental balance and intervention within the natural environment	201 (21.7)	362 (39.0)	236 (25.4)	129 (13.9)
14. Environmental hazards: Soil erosion, drought, dessert encroachment, deforestation and pollution, causes, effects and prevention	306 (33.0)	400 (43.1)	157 (16.9)	65 (7.0)
15. World Population: Factors and patterns of growth, distribution and movement; growth rate problems, e.g. Amazon basin, India, Japan, etc.	269 (29.0)	395 (42.6)	174 (18.8)	90 (9.6)
16. Settlement: Types (rural and urban): patterns and factors affecting location, growth and size, functions of rural and urban settlement.	413 (48.1)	355 (38.3)	105 (11.3)	55 (5.9)
17. Transportation: Types (roads, railways, water, air), transportation and economic development; problems of transportation	446 (48.1)	361 (38.9)	83 (8.9)	38 (4.1)
18. Manufacturing industry: Types (heavy and light industry), factors of industrial location	238 (25.6)	362 (39.0)	213 (23.0)	115 (12.4)
19. World trade: Factors of trade, major commodities (agric, manufactured goods and mineral products), World trade routes	218 (23.5)	355 (38.3)	210 (22.6)	145 (15.6)
20. Regional Geography of Nigeria: Nigeria on broad outlines. Geographical regions of Nigeria	168 (18.1)	341 (36.8)	251 (27.0)	168 (18.1)
21. Geography of Africa: Africa on broad outlines – location, size, position, political divisions, physical setting relief, drainage, climate, vegetation, distribution of major minerals).	43 (14.3)	359 (35.5)	327 (35.2)	199 (21.4)
22. Selected Topics e.g. lumbering in Equatorial Africa, irrigation agriculture, plantation agriculture, gold and copper mining, South Africa, Zaire and Zambia, population distribution in West Africa, ECOWAS	187 (20.1)	312 (33.6)	229 (24.7)	200 (21.6)

In summary, according to students' rating, Physical Geography is the easiest (79.7%), followed by Human Geography (73.6%). On the other hand, Geography of Africa (51.5%) is the most difficult followed by Practical Geography (49.0%) and Geography of Nigeria (45.1%) (Table 2).

Table 2: Summary of students' assessment of difficulty levels of Geography broad topics

Geography Broad Topics	VE	E	D	VD
1. Practical Geography	173 (18.6)	300 (32.3)	220 (23.7)	235 (25.3)
2. Physical Geography	349 (37.5)	390 (42.1)	133 (14.3)	56 (6.0)
3. Human Geography	317 (34.1)	365 (39.4)	157 (16.9)	89 (9.5)
4. Regional Geography of Nigeria	168 (18.1)	341 (36.7)	251 (27.0)	168 ()18.1
5. Geography of Africa	115 (12.4)	335 (36.2)	278 (30.0)	200 (21.5)

Research Question 2: Is there a significant difference in the assessment of difficulty levels of SSS Geography topics by male and female students?

Table 3: T-test comparison of assessment of difficulty levels of Geography topics by male and female students

Gender	N	Mean	S.D	t-Obs	Df	Sig.(P)	Remarks
Female	471	64.35	7.87	1.38	926	.167	NS
Male	457	63.57	9.43				

NS – Not Significant at 0.05 alpha level

As shown in Table 3, the observed t-value which indicates the level of difficulty of Geography topics as assessed by male and female Geography students is 1.38 ($p>0.05$). This implies that there is no significant difference in the male and female students' assessment of the level of difficulty in Geography topics.

Research Question 3: Will the students' subject area significantly affect their assessment of difficulty levels of SSS Geography topics?

Table 4: Impact of students subject area on assessment of difficulty levels of Geography topics

	Sum of squares	df	Mean square	F	Sig. (P)	Remark
Between groups	1671.26	2	835.63	11.350	.000	Sign.
Within groups	68104.71	925	73.63			
Total	**69775.96**	**927**				

Table 4 shows that the f-ratio indicating the effect of students' subject area on their assessment of difficulty levels of Geography topics was 11.35 ($p<0.05$). This result indicates that the subject areas of students significantly affect the difficulty they perceive in Geography topics.

Research Question 4: Does teachers' gender have a significant effect on students' assessment of difficulty levels of SSS Geography topics?

Table 5: Impact of teacher gender on students' assessment of difficulty level of Geography topics

Gender	N	Mean	S.D	t-Obs	Df	Sig.(P)	Remarks
Female	193	63.16	8.15	-1.460	926	.145	NS
Male	735	64.18	8.80				

NS – Not significant of 0.05 alpha level

The t-observed (-1.460) was not significant at an alpha level of 0.05 (Table 5). It therefore implies that the assessment of difficult levels of Geography topics by students was not affected by the gender of their Geography teacher.

Research Question 5: Does teachers' qualification have a significant effect on the way students assess difficulty levels of SSS Geography?

Table 6: Impact of teacher qualification on students' assessment of difficulty levels of Geography topics

	Sum of squares	df	Mean square	F	Sig. (P)	Remark
Between groups	1142.28	5	228.456	3.069	.009	Sign.
Within groups	68633.68	922	74.440			
Total	**69775.96**	**927**				

As revealed in Table 6, the F-ratio was significant ($F = 3.069$; $P<0.05$). This implies that the qualifications of Geography teachers have significant effect on Geography students' assessment of how difficult Geography topics are.

Research Question 6: Will Geography teacher's teaching experience significantly affect students' assessment of difficulty level of Geography topics?

Table 7: Impact of teacher's teaching experience on student's assessment of difficulty levels of Geography topics

Teaching Experience	N	Mean	S.D	t-Obs	Df	Sig.(P)	Remarks
Low	452	62.98	8.52	-3.387	926	.001	NS
High	476	64.90	8.73				

Table 7 indicates that the t-observed showing the effect of teacher's teaching experience on student's assessment of difficulty level of Geography topics is significant (t_{obs} = -3.387; P<0.05). it therefore means that teacher's teaching experience has a significant effect on the student's rating of the difficulty levels of Geography topics. The negative value of the t-observed also implied that the more experienced Geography teachers are the less difficult their students rate the topics in Geography.

Discussion

The syllabus for the West African Senior School Certificate categorized Geography into five broad headings – Practical Geography, Physical Geography, Human Geography, Regional Geography of Nigeria and Geography of Africa – with a total of 22 topics. Physical Geography was rated as the simplest followed by Human Geography. The reason for this observed pattern could be linked with the way the entire senior secondary school curriculum is arranged and taught. Geography teaching in senior secondary schools in Nigeria runs for three years duration (Falaye, 2006). The first set of topics which Geography students are exposed to in the classroom are those topics which constitute Physical Geography. It is most likely that the entire topics under Physical Geography are adequately covered before students write their final SSCE in their third year, hence, they may find Physical Geography easier than the other topics.

In line with this arrangement, all basic Geography textbooks recommended by the Ministries of Education have topics in Physical Geography presented first. Also, Physical Geography topics are always well illustrated with vivid pictures, sketches and diagrams, which may flare up the interest of learners. These may motivate them to learn the topics and thus find them easier than other topics. This is however at variance with Weeden (2008) who thinks that drawing maps and diagrams is one of the activities pupils disliked in Geography.

The reason for rating Human Geography easy by students can be adduced to interest and motivation as well. An analysis of Human Geography topics shows that the content focuses more on aspects that are familiar with the students. For example, topics such as Settlement Types, Types of Transportation, Manufacturing Industries, Trade and the major commodities like Agriculture and Manufactured Goods are not foreign to the students, hence may influence their rating Human Geography as an easy broad topic. A rather unexpected finding is the rating of Geography of Nigeria and Africa as difficult topics. It is expected that since these topics deal with students' home country, they would find the topics easy. Perhaps, the way teachers teach these topics would serve to explain the difficulty students experience in learning them, and hence their rating.

It is not surprising that students found Practical Geography difficult especially Elementary Surveying. Elementary Surveying, has very recently, made an in-road into secondary school Geography in Nigeria. Long before now, it had been limited to the curriculum at the tertiary level excluding even the Colleges of Education. It appears many Geography teachers do not have an in-depth knowledge of the content of Elementary Surveying, hence, they often leave out the aspects they cannot competently teach.

Other findings of this study reveal that teachers' teaching experience, qualification and students' subject area affect the way students assess the difficulty levels of Geography topics. Teachers' teaching experience and qualification are indices of teacher effectiveness. Even though teaching experience may not always impact positively on teaching effectiveness (Rosenholtz, 1986), many researchers believe that qualification is a prerequisite for teacher effectiveness. It would seem, therefore, in this study that students taught by highly qualified teachers are likely to find the topics easy and vice-versa.

From the perspective of student factor, the student subject area also affects the way they rate the different Geography topics. In this study, however, attempt was not made to

determine how the different groups of students, that is, those in Science, Commercial and Arts classes rated the Geography content.

Summary and Conclusion

The study highlighted that many Geography students rated Elementary Surveying difficult. This may be due to its newness in the secondary school Geography curriculum and inadequate preparation for teaching Elementary Surveying in terms of equipments and teacher skills. If teachers' competence is to improve, there is need to organize short term refresher courses during vacations to increase teacher effectiveness in handling Elementary Surveying. With respect to the Geography of Nigeria, which surprisingly students rated slightly difficulty, teachers should be encouraged to include out-door activities such as field trips and excursions. These activities are likely to enlist students' interest in the topic.

Although teachers' qualification, teaching experience and students' subjects area influence their assessment of the difficulty level of Geography topics, further research is suggested to reveal the differential effects of these variables on the students' assessment of difficulty levels of the senior secondary school Geography.

References

Andrews, M. & Schwab, R. L. (1995). Has reform in teacher education influenced teacher performance? An outcome assessment of graduates of eleven teacher education programmes. *Action in Teacher Education*, 17, 43-53.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Achieves*, Vol. 8, No. 1.

Denton, J. J. & Peters, W. H. (1988). Curriculum evaluation of a non-traditional programme for certifying teachers. *Programme Assessment Report*. Texas A & M University, College Station, TX.

Fadare, F. A. (2001). A comparative analysis of West African Examination Council (WAEC) and National Examination Council (NECO) Physical items difficulty level. An unpublished M.Ed Dissertation.

Falaye, F. V. (2006). Numerical ability, course of study and gender differences in students' achievement in practical geography. *Research in Education*, 76, 33-42.

Federal Government of Nigeria (FGN) (1998). *National Policy on Education*, Federal Ministry of Information.

……. (2004). *National Policy on Education*. Federal Ministry of Information.

Ferguson, R. F. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation*, 28, 2, 465-498.

Ferguson, R. F. & Ladd, H. F. (1996). How and why money matters: An analysis of Alabama schools, 265-298 in Ladd. H. (Ed.) *Holding Schools Accountable*. Washington, DC, Brookings Institution.

Fetler, M. (1999). High school staff characteristics and mathematics test results. *Education Policy Analysis Archives*, 7, 9 (http://epaa.au.edu/epaa/v7n9.html).

Onabanjo, I. O. (1999). Topic difficulty in Senior Secondary School Mathematics. *African Journal of Educational Research*, Vol. 5, No. 1.

Oyedeji, O. A. (1996). Difficult teaching topics in mathematics syllabus for Nigerian secondary school: *OSU Journal of Educational Studeis*, 4(1), 81-89.

Rosenholtz, S. J. (1986). The organizational context of teaching. In Learning to Teach. University of Illinois at Champaign-Urbana.

Weeden, P. (2007). Students' perception on Geography: Decision making at age 14. http://Geography.org.uk/journals/journal.asp?article115-328

..... (2006). Pupils' perception of Geography, a literature review. http://66.102.9.104/search?

West African Examination Council (WAEC) (2004-2008). Regulations and syllabuses for the West African Senior School Certificate Examination, Lagos: WASSCE.

West African Examination Council (WAEC) (1997), students and teacher's perception of difficulty lever of topics in SSCE further Mathematics syllabus. *Completed Research Projects*, 7:34-53.

West African Examination Council (WAEC)(1995). Students', teachers' and experts' perception of the difficulty of SSCE essay questions. *Completed Research Projects*, 5:1-13