

EFFECT OF POWERPOINT PRESENTATION ON STUDENTS' COGNITIVE ACHIEVEMENT IN GEOGRAPHY

ADAMS OGIRIMA ONIVEHU

Department of Social Sciences Education, Faculty of Education, University of Ilorin, Nigeria,
e-mail: adamsonivehu@gmail.com

ONYIYECHE EMILIA OHAWUIRO

Department of Educational Technology, Faculty of Education, University of Ilorin, Nigeria,
e-mail: emiliaohawuiro@gmail.com

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Abstract

The integration of technology in the teaching-learning process is a topical issue that has been under research light for decades. Consequently, findings on the achievement of students exposed to PowerPoint presentation have been inconclusive. To this end, this study determined the effect of PowerPoint presentation on students' cognitive achievement in Geography using a pre-test-post-test, non-randomized experimental group design. Ninety senior secondary school students from two secondary schools in Ilorin, Kwara State, Nigeria formed the sample, which was further subdivided into experimental and control groups. The experimental group was taught some selected concepts from Geography using PowerPoint presentation, while the conventional lecture method was used for the control group. A validated Geography Achievement Test (GAT) comprising 50 multiple-choice items was used for data collection. The reliability coefficient of GAT was .83 using Kuder Richardson (KR-21). The hypotheses were tested using t-test statistical tool. Results revealed that the students taught with PowerPoint presentation performed better than their counterparts taught using the lecture method. In addition, gender did not influence students' cognitive achievement in Geography. Based on the findings, it was recommended that teachers and resource persons in Geography education in Nigeria should use PowerPoint presentation.

Keywords: PowerPoint presentation, Geography, cognitive achievement, gender

INTRODUCTION

Education has been recognized as a fundamental process for fostering economic and social development. To this end, therefore, education is generally acknowledged as a critical engine that drives the other Sustainable Development Goals (SDGs) which are set to be achieved by year 2030 (United Nations Development Programme, 2017). Thus, given the importance of the interaction between man and other essential components of the environment to sustainable development in any nation, especially in view of the myriad of global challenges in the 21st century, such as natural disasters, climate change, terrorism, wars, migration, internal displacement among others, there is no gainsaying that the content of the curriculum at the secondary school level is vital to the sustainable development of any nation, Nigeria inclusive. In other words, the curriculum, if it is implemented properly, is an effective and efficient means of equipping secondary school students with the necessary knowledge, skills, information, character and competence to cope with the ever-changing trends of the world.

Consequently, the curriculum for Senior Secondary School in Nigeria is spirally structured to cover four broad fields of studies. These include Science and Mathematics, Technology, Business Studies, and Humanities. Further, these broad fields are sub-divided into specific subjects in order to achieve specific behavioural objectives. Geography, for instance, is a typical example of a subject under the sub-division of the field of Humanities, with a broad spectrum of specified teaching-learning strategies recommended for the effective implementation of the curriculum. Specifically, two hours per week is recommended as the minimum instruction time for Geography in the curriculum, while students are expected to be evaluated in a formative and summative manner in the cognitive, affective, and psychomotor domains. Substantiating the foregoing, Orji and Uka (2012) noted that Geography is found under both core and non-vocational electives categories in the Senior Secondary curriculum in Nigeria. In this sense, therefore, it is conceivable that secondary school students in Nigeria are expected to offer Geography either as a core or as an elective subject during the three-year period of senior secondary education.

In broad terms, Geography is distinctive from other disciplines due to its capability to draw knowledge from the Natural Sciences, the Social Sciences and Humanities, and to incorporate the knowledge drawn to achieve a holistic and integrated understanding of human existence. Therefore, Geography is gestalt in nature and presents a phenomenon as a whole. That is, the knowledge of Geography is not only relevant and useful to the learners in the classroom, but to all humans who have to live with the dynamic realities of contemporary times (Akintade, 2011). Nevertheless, the main rationale for including Geography Education in the

secondary school curriculum is premised on the relevance of the subject to the process of equipping students with the necessary knowledge that is needed to understand both natural and human phenomena within the immediate environment and beyond.

Specifically, the objectives of Geography Education in Nigerian secondary schools are set to help students: understand the concept of different characters and the spatial relationship of the features on the Earth surface; understand the concept of man-environment relation, that is, to examine and explain the interaction of man with his physical and cultural environment; acquire the basic knowledge of nature and function of physical and human environments and understand the impact of their inter-relationships; organize and formulate principles according to acquired geographical concepts and apply these principles to interpret and analyse spatial problems in the immediate and wider environment; develop skills and techniques for accurate, orderly and objective geographical investigations to be carried out both in the classrooms and in the environment (National Examinations Council, 2012). However, in practice, these goals are yet to be achieved, irrespective of their robust nature, because of a plethora of factors that militate against the effective teaching and learning of Geography in Nigerian secondary schools.

In this wise, the lecture method with its attendant drawbacks is still widely used in the teaching of Geography in most Nigerian secondary schools. Similarly, relevant instructional materials that could be harnessed to facilitate the teaching and learning of Geography are grossly inadequate and not available (Udo, 2004; Jeje, 2005; Yusuf & Yakubu, 2013; Ojeifo, 2013). Consequent upon this, there is a consensus among stakeholders in the Nigerian educational system that it is apposite to harness the diverse potentials of Information Communication Technology for students' maximum achievement. Of great importance in this respect is the plethora of benefits that are attached to the effective use of communication software for instructional purposes. PowerPoint presentation is a typical example of communication software, which has significantly transformed the teaching-learning process for decades.

Hence, the teaching-learning process is significantly enriched when the traditional lecture method is supported with information delivered by computers in the form of PowerPoint presentations, as these presentations are more appealing to the audio-visual sensual modalities, captivating, motivating, and fosters critical thinking skills and concretization of abstract concepts in the teaching-learning process (Sagay & Pandey, 2014). PowerPoint, a presentation software developed by Microsoft Corporation, operates or runs under certain operating systems. A presentation software is a computer software that is used to create information as a slide show presentation that can be displayed on a computer monitor or projected onto a large screen. PowerPoint Presentations can simply be done by inputting texts on coloured background templates or a more complex option can be employed by adding tables, pictures animation, sound effects, video clips,

and so on (Cornwell, 2014). In the field of education, PowerPoint presentations are considered relevant in facilitating the learning of any subject content due to the following reasons. For instance, the basic features of PowerPoint are easy to utilize and make the lesson look more organized.

Similarly, the main thrust of a lesson can be presented using bullets in PowerPoint presentation for easy recall (Savoy, Proctor & Salvendy, 2009). Further, changes can be made in PowerPoint presentations if need be, unlike images on cardboards or printouts. In addition, even a novice can make a creative and eye-catching design because PowerPoint has standard templates and themes that can be used as guide. It is also suitable for a large class size. PowerPoint also allows the integration of documents, spreadsheets, graphics, animation and video clips from other application to a presentation (Erdemir, 2011). PowerPoint helps students to appreciate the details, distinctive features, and critical points in the figures on the slides when graphic presentations are used. More so, hand-drawn images are difficult and stressful to manipulate for instructional purposes especially when teachers are tasked with describing abstract concepts in Geography (Bartsch & Cobern, 2003; Yucel, 2007). This is especially true in the teaching of Geography, a broad subject whose learning needs many images, drawings, visuals and graphs, realia, natural resources, etc.

Thus, Geography could be more interesting for students to learn when the effective use of PowerPoint slides are leveraged to help students encode information into the auditory working memory and relevant images into the visual working memory so as to integrate them with prior knowledge. Hence, the extent to which students are able to retrieve the encoded information about several geographical concepts in a certain setting to achieve some pre-determined goals is germane to their achievement in Geography. Generally, cognitive achievement is a major criterion or benchmark for assessing the effectiveness of any teaching-learning process, PowerPoint presentation included (Adegunju *et al.*, 2017).

For instance, Gier and Kreiner (2009) examined the effectiveness of PowerPoint in a psychology class and found that when students were actively engaged in the class using PowerPoint presentation, information retention increased. Nouri and Shahid (2005) found out in another study that students in a PowerPoint section of an Accounting Principles II class perceived higher understandability of the presented materials than their counterpart in the control group. Raver and Maydosz (2010) found that students who had access to instructors' PowerPoint slides before or after the lecture performed better than students who were not provided with these aids. Erdemir (2011) also found that Physics students taught with the support of PowerPoint slides had higher grades than the control group who were solely taught through traditional presentations. Gambari *et al.* (2016) also found that technical drawing student taught with PowerPoint performed better than their counterparts taught with the chalkboard method.

On the other hand, some studies have found contrary findings to the aforementioned. In this sense, Daniels (1999) studied the effectiveness of PowerPoint in a college level Economics class and found no significant difference in student performance. Another study on engineering students by Savoy *et al.* (2009) showed that there was no evidence that PowerPoint can enhance students' performance more than the traditional lectures. Root-Kustriz (2014) found that the performance of advanced veterinary students who were taught with PowerPoint was not different from the students in the lecture group. Thus, it is plausible to infer from these studies that there is a growing body of inconclusive findings on the effect of PowerPoint presentation on students' performance. Likewise, extant studies did not focus on the effect of PowerPoint on students' cognitive achievement which is defined as students' attainment as reflected by the score obtained on a Geography Achievement Test (GAT) in the present investigation.

Based on these findings, it is deducible that there is a paucity of related studies among students offering Geography in Nigerian secondary schools. The purpose of this study was to examine the effect of PowerPoint on students' cognitive achievement in a Geography class, at the Senior Secondary school level in Nigeria.

RESEARCH HYPOTHESES

The following hypotheses were postulated to guide the study:

1. There are differences in the mean achievement scores of students taught Geography using PowerPoint presentation and those taught with lecture method;
2. There are differences in the pre-test and post-test mean scores of students taught Geography using PowerPoint presentation;
3. There is no significant difference in the mean achievement scores of male and female students taught Geography using PowerPoint presentation.

METHODOLOGY

The quasi-experimental design using non-randomized, pre-test, post-test experimental group design was adopted for this study because it involves the selection of groups and testing of variables without random pre-selection (Creswell, 2012). Thus, two levels of independent variables (experimental and control groups), two levels of gender (male and female)

were investigated about students' achievement in Geography. The research design layout is as shown in Table 1.

Table 1. Research Design of the Study

Groups	Pre-test	Treatment	Post-test
Experimental	O ₁	PowerPoint	O ₂
Control	O ₃	Lecture Method (Chalk-talk)	O ₄

Purposive sampling technique was used to select two schools in Ilorin Metropolis, Kwara State for the study. The schools were selected based on the availability and accessibility of the facilities needed for the study and based on gender composition (co-educational schools). The two schools were randomly assigned to experimental group (PowerPoint group) and control group (Lecture Method group) respectively. The study was conducted with 90 senior secondary two Geography students (i.e. 40 males and 50 females; aged 13-19). Both the experimental and control groups consisted of 45 secondary school students exposed to PowerPoint presentation and the lecture method (conventional instruction with the chalkboard) respectively.

In the experimental group, the PowerPoint (PPT) with Geography contents (environment and its resources, Regional Geography of Nigeria and Economic and Human Geography) was presented using laptop and a Liquid Crystal Display (LCD) projector. Specifically, the teacher presents information and displays animation of the contents to the students using PPT on each of the selected concepts in Geography, which include functions of urban and rural settlements in Nigeria, economic importance of rocks and soil erosion. Geography Achievement Test (GAT) was a researcher-developed instrument used in collecting data for the study. The GAT was used as a pre-test and post-test measure in the study. It consists of section A and B. Section A elicited students' demographic information. Section B of the GAT consists of 50-multiple-choice test items with five options (A-E). The score for each item was two points, while the maximum score was 100 points. Experts in the Faculty of Education, University of Ilorin, Nigeria, validated the GAT. Its reliability coefficient was obtained as .83 using Kuder Richardson (KR-21).

The duration of the study was for three weeks. The researchers administered the GAT on sampled students as pre-test to ascertain the equivalence of the students before the treatment. Treatment followed immediately; thereafter GAT was administered as post-test to measure the achievement of the sample students in each group. The scores obtained

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RESULTS

Table 2. Mean and *t*-test Statistics on post-test scores of Experimental and Control Groups

Groups	No	Mean	SD	df	Cal .t-value	Crit. t-value	P-value
Experimental	45	33.17	4.23	88	8.34	1.96	0.04
Control	45	29.82	5.68				

As shown in Table 2, the mean score of the experimental group was higher than the mean score of the control group. These results show that there is a significant difference between the scores of both groups ($t_{(88)}=8.34$, $p<.005$) after instruction. Thus, it is inferable that PowerPoint presentation had a positive effect on students' cognitive achievement in Geography.

Table 3. Mean and *t*-test statistics on pre-test and post-test scores of the experimental group

Groups	No	Mean	SD	df	Cal .t-value	Crit. t-value	P-value
Pre-test	45	32.67	5.93	88	5.08	1.96	0.01
Post-test	45	35.50	7.20				

As shown in Table 3, the pre-test mean score of the experimental group was $M=32.67$ before instruction, and the post-test mean score was $M=35.50$ after instruction. These results show that there was a significant difference between mean scores of the pre-test and post-test of the experimental group ($t_{(88)}=35.50$, $p<.005$).

Table 4. Mean and *t*-test statistics on post-test scores of males and female in the experimental group

Groups	No	Mean	SD	df	Cal .t-value	Crit. t-value	P-value
Male	21	9.70	3.83	43	0.82	1.96	0.35
Female	24	10.02	3.62				

As shown in Table 4, the mean score of male respondents was 9.70 and standard deviation of 3.83, while the mean score of female respondents was 10.02 and standard deviation of 3.62. These results show that there was no significant difference between mean scores of the male and female respondents in the experimental group ($t_{(43)}=0.82$, $p>.005$).

DISCUSSION

The teaching strategy or method that a teacher adopts is one factor that is of great importance to students' achievement in any subject. Thus, it therefore follows that the utilization of the appropriate teaching method is essential to the effective teaching and learning of Geography. In a similar manner, the role played by gender as a moderating variable in the achievement of Geography students is an issue that has generated a plethora of research with inconclusive findings. For instance, Filgona (2016) found a difference in the achievement of Geography students because Geography was generally perceived as masculine subject. In another study, Yusuf and Yakubu (2013) found that girls perform better than boys do in Geography in the selected secondary schools in Zaria inspectorate division of Kaduna State, Nigeria. Substantiating the foregoing, Suwopoleme *et al.* (2016) found that the instructional methods utilized by Geography teachers might have an interactive effect with gender and students' achievement in Geography. Likewise, Filgona and Sakaba (2017) found that female Geography students exposed to mastery learning strategy performed better than their male counterparts in Ganye Educational Zone, Nigeria. To this end, the focus of this research was to determine the effect of PowerPoint presentation on students' cognitive achievement in Geography and to determine if gender had any influence on students' achievement.

Given that the lecture method is widely utilized to teach students new principles and concepts in Geography because it saves time and effort in large classes, it was applied to teach the control group in this study. Hence,

students in the control group were exposed to new concepts as presented by the teacher, without the use of relevant photographs and diagrams that are related to the content of the lesson. Thus, the teacher introduced the lesson, presented the subject matter, summarized the lesson and concluded the lesson with the use of the chalkboard. The presentation was carried out verbally as students listened keenly to the teacher and responded to the teacher's inquiry.

On the other hand, students in the experimental group were exposed to a PowerPoint presentation designed with relevant photographs, diagrams, animations, and colour. The teacher provided ample opportunity for students to relate the content of the lesson with relevant experiences by making the lesson interactive as the teacher explained the contents of each slide during the lesson while the students listened, watched, and took down relevant information in their notebooks. The PowerPoint presentation was used as treatment during the study only and, as such, students were not given the opportunity to study the slides before and after the lesson. By so doing, students in the experimental group were exposed to an enriched form of instruction that was designed to appeal to their visual and auditory sensual modalities in contrast to the form of instruction given to their counterparts in the control group, which was majorly based on the teachers' talk.

The t-test on hypothesis one, which states that "there are differences in the mean achievement scores of students taught Geography using PowerPoint presentation and those taught with lecture method" indicated that there was a significant difference between mean scores of the pre-test and post-test of the experimental group ($t_{(88)}=8.34$, $p<.005$). This finding may be attributed to the animated PowerPoint slides, with relevant photographs and diagrams that were harnessed to facilitate the learning of Geography for students in the experimental group. Supporting this finding, Raver and Maydosz (2010) found that students who had access to instructors' PowerPoint slides performed better than their counterparts who did not access the same treatment. In addition, Gambari *et al.* (2016) made a similar conclusion that technical drawing students exposed to PowerPoint presentation performed better than their counterparts taught with chalkboard method.

However, it differs from Root-Kustriz's (2014) earlier finding that PowerPoint presentation had no effect on performance of advanced veterinary students. Root-Kustriz's position may have been influenced by the sample for his study, which was drawn from students enrolled in an advanced veterinary medicine course. To substantiate this finding, the result in Table 3 showed that the pre-test mean score of the experimental group was higher after the respondents were exposed to PowerPoint presentation. This is line with the finding of Erdemir (2011) among Physics students.

On the influence of gender on students' achievement in the experimental group, it was found in the present investigation that there was

no significant difference between mean scores of the male and female respondents that were exposed to the PowerPoint presentation. This may be because all the students in the experimental group were exposed to the same PowerPoint presentation at the same time irrespective of gender. Thus, it is conceivable that PowerPoint was gender friendly for the respondents. This finding is consistent with that of Gambari *et al.* (2016), who found no significant gender difference in the achievement of technical drawing students.

CONCLUSION

PowerPoint is an application software that has significantly changed the process of communication in the field of education for decades. However, there is no question that specific applications of PowerPoint in the teaching-learning process requires more research endeavours. In the light of the foregoing, therefore, this study examined the effect of PowerPoint presentation on students' cognitive achievement in Geography.

Hence, this research led to a number of conclusions. Firstly, PowerPoint presentation had a positive effect on students' cognitive achievement in Geography. More so, that there was a significant difference between the pre-test and post-test mean scores of the Geography students taught with PowerPoint presentation. Finally, the study concluded that there was no significant difference between mean scores of the male and female respondents in the experimental group. Based on these findings, it is recommended that the resources for the effective integration of PowerPoint in the teaching and learning of Geography in Nigerian secondary schools should be made available and accessible for teachers. Likewise, it is germane to expose Geography teachers to professional teacher development programmes that could be harnessed to enhance teachers' level of competence in the integration of PowerPoint in Geography education.

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Annex 1

GEOGRAPHY ACHIEVEMENT TEST (GAT) PRE-TEST/POST-TEST TO BE FILLED IN BY STUDENTS

Dear Respondent/Student,

The purpose of this test is to collect data for research and therefore not intended to test the performance of your school. You are kindly requested to answer the questions by selecting one out of the four options (A, B, C and D) by ticking in section A and section B.

Section A: Demographic Data

1. Gender male () female ()

2. Name of student _____

Section B: This section is made up of 50 objectives questions. You are to answer all questions

1. Which of the following rocks is formed from the accumulation of materials derived from other rocks, which have been cemented together for many years?

26. Which of the following is an example of an intrusive igneous rock?

- a. Sandstone
b. Marble

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- a. Organically formed sedimentary rocks
 - b. Mechanically formed sedimentary rocks
 - c. Metamorphic rocks
 - d. Plutonic rocks
2. A soil profile is also called
 - a. Vertical section of the soil
 - b. Mineral composition of the soil
 - c. Gradient of the soil
 - d. Slope of the soil
 3. Which of the statements best explains the relationship between rural and urban centres?
 - a. Cities and rural areas depend on each other
 - b. Cities that are not important as rural areas
 - c. Rural areas are more productive than cities
 - d. Rural areas have more resources than cities
 4. Which of the following rocks does not allow water to pass through them
 - a. Impermeable rocks
 - b. Impervious rocks
 - c. Pervious rocks
 - d. Porous rocks
 5. Which of the following is not an environmental hazard?
 - a. Deforestation
 - b. Sedimentation
 - c. Soil erosion
 - d. Desertification
 6. The natural resources of Nigeria include all but one of the following
 - a. Trees
 - b. Humans
 - c. Rivers
 - d. Rocks
 7. The predominant system of agriculture among urban farmers in Nigeria is
 - a. Mixed farming
 - b. Plantation agriculture
 - c. Irrigation farming
 - d. Bush fallowing
 8. Which of the following environmental hazards has been paired with the right factor?
 - a. Soil erosion and flood
 - b. Drought and sandstorm
 - c. Earthquakes and human factor only
 - d. Deforestation and human factor only
 9. Which of the following does not interfere with the natural environment?
 - a. Road construction
 - b. Pollution
 - c. Soil erosion
 - d. Dry season
 10. Which of the following states in Nigeria is mostly urban and over populated?
 - a. Shale
 - b. Granite
 27. Which of the following is not a possible cause of soil erosion?
 - a. Afforestation
 - b. Over-grazing
 - c. Deforestation
 - d. Bush burning
 28. One significant benefit of rocks to an economy is that it
 - a. Leads to beautification of the environment
 - b. Earns foreign exchange
 - c. Leads to soil erosion
 - d. Causes flooding
 29. Which of the following rocks is formed from the solidification and cooling of magma?
 - a. Sedimentary
 - b. Metamorphic
 - c. Igneous
 - d. None of the above
 30. Which of the following best describes what leaching of soil means
 - a. Water logging of the soil
 - b. Washing of nutrients down from the upper layers of the soil
 - c. Removal of parent material from the soil
 - d. Formation of hardpan in the soil
 31. Which of the following types of rocks is used as the coating of many types of chewing gum?
 - a. Granite
 - b. Limestone
 - c. Basalt
 - d. Shale
 32. Which of the following criteria is not important in distinguishing between a village and a town?
 - a. Geographical location
 - b. Population size
 - c. Social amenities
 - d. Variety of activities
 33. Which of the following is a disadvantage of high population density in urban areas?
 - a. Unemployment
 - b. Low crime rate
 - c. Low pressure on social amenities
 - d. Regular flow of traffic
 34. Which of the following rocks are formed by application of temperature and pressure on pre-existing rocks?
 - a. Igneous
 - b. Sedimentary
 - c. Metamorphic
 - d. Aso rock
 35. Nigeria is vulnerable to soil erosion because
 - a. Soils are porous
 - b. Landscape is characterized by mountain

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- a. Borno
 - b. Bayelsa
 - c. Kebbi
 - d. Lagos
11. The least important factor for the location of settlements in urban areas is
- a. Minerals
 - b. Communication network
 - c. Water
 - d. Fertile land
12. Which of the following minerals resources is made from sedimentary rock?
- a. Coal
 - b. Gold
 - c. Diamond
 - d. Aluminum
13. The degree of fineness of rocks is referred to as
- a. Texture
 - b. Density
 - c. Aggregates
 - d. Solidification
14. The best example of a non-renewable resource among the following is
- a. Water
 - b. Soil
 - c. Minerals
 - d. Air
15. Which of the following is not an effect of rural-urban migration on the source region?
- a. Rural depopulation
 - b. Urban depopulation
 - c. Urban congestion
 - d. Rural unemployment
16. Urbanization can be best described as the
- a. Migration of people from urban to rural areas
 - b. Migration of people from one urban centre to another
 - c. Growth of towns, especially in terms of human population and physical size
 - d. Eventual merging of two urban centres to single, sprawling
17. The prime agents in soil erosion are
- a. Wind and waves
 - b. Water and dirt
 - c. Water and wind
 - d. Air and water
18. The effect of humus in the soil is to make the soil
- a. Retain more air
 - b. Retain more moisture
 - c. Sparkle
 - d. Hard
19. All the following are major pollutants of the environment except
- a. Domestic cooking
 - c. Rainfall is heavy all over Nigeria
 - d. Soils are carelessly exposed
36. Coal and mineral oil resources are usually found embedded in
- a. Sedimentary rocks
 - b. Igneous rocks
 - c. Crystalline rocks
 - d. Metamorphic rocks
37. Which of the following is the smallest form of settlement
- a. Farmstead
 - b. Village
 - c. City
 - d. Town
38. Marble is a metamorphic rock formed from
- a. Clay
 - b. Limestone
 - c. Granite
 - d. Coal
39. A village is characterized by
- a. The presence of several industries
 - b. Availability of developed infrastructural facilities
 - c. Primary economic activities
 - d. Airports
40. Rocks can be classified into how many types based on the process of their formation
- a. 5
 - b. 3
 - c. 2
 - d. 4
41. Which of the following least influences the growth of settlements?
- a. Age
 - b. Climate
 - c. Mineral resources
 - d. Population
42. The major effect of soil erosion in Nigeria is
- a. Cooling of adjacent areas
 - b. Destruction of valuable properties
 - c. Increase in volume of water available for domestic use
 - d. Low yield per hectare of arable land
43. Which of the following resources is renewable?
- a. Soil
 - b. Hills
 - c. Mountains
 - d. Minerals
44. The following minerals are found in Nigerian rocks except
- a. Coal
 - b. Bauxite
 - c. Tin ore
 - d. Columbite
45. The major difference between towns and

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- b. Soil erosion
 - c. Oil spillage
 - d. Electronic waste
20. Igneous is formed from the term "ignis" meaning
- a. Water
 - b. Earth
 - c. Wind
 - d. Fire
21. Settlements can be classified according to all the following except
- a. Arrangement of the buildings
 - b. Number of people per settlement
 - c. Main occupation of the inhabitants
 - d. Number of building per unit area
22. Soil erosion leads to the following except
- a. Loss of available plant nutrients
 - b. Loss of arable land
 - c. Loss of water storage facilities
 - d. Increase in yield per hectare
23. Which of the following rocks is used for fuel production
- a. Granite
 - b. Diorite
 - c. Lignite
 - d. Mica
24. Urban settlements depend on rural settlements for the provision of
- a. Employment
 - b. Agricultural products
 - c. Manufactured goods
 - d. Innovations
25. Which of the following resources come from rocks of the Earth's core
- a. Iron and magnesia
 - b. Silica and nickel
 - c. Iron and nickel
 - d. Silicon and magnesia
- villages is that
- a. Towns contain more social amenities
 - b. Villages have more peace
 - c. Towns perform more civic functions
 - d. Villages have more food
46. Most of the industries located in rural area are
- a. Market-oriented
 - b. High energy-oriented
 - c. Raw material oriented
 - d. Transport-oriented
47. Which of the following makes up about 66% of the Earth's crust?
- a. Sedimentary rocks
 - b. Metamorphic rocks
 - c. Igneous rocks
 - d. Plateaus
48. One characteristic of intensive farming is that it is usually practiced in urban centres with
- a. Inadequate water supply
 - b. Large population
 - c. Low population
 - d. Mineral deposit
49. Chalk is a good example of
- a. Organically formed sedimentary rock
 - b. Mechanically formed sedimentary rock
 - c. Plutonic igneous rock
 - d. Extrusive igneous rock
50. Which of the following types of rock is used to produce energy?
- a. Sandstone
 - b. Graphite
 - c. Coal
 - d. Granite