Perceived Effects of Noise Pollution on Classroom Instruction and Students Concentration in Tertiary Institutions in Imo State

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Abstract: *This work investigated the perceived effects of noise pollution on classroom instruction and students concentration in tertiary institutions in Imo State. Two specific purposes of study and two research questions guided the study. Descriptive survey research design was used for the study. A sample of 4,000 students was drawn from a population of 68,350 by simple random sampling technique. Two instruments; questionnaire and guided interview were used to collect data. Data collected were analyzed using mean and standard deviation. The result of the data analysis revealed that noise interferes with classroom instruction and reduce the concentration of students in academic activities. The study recommends the elimination of all elements that may lead to noise pollution from the classroom environment.*

Keywords: Noise, Pollution, Noise pollution, Classroom instruction, Students concentration

1. Introduction

Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the environment. A clear understanding of the physical environment in which we operate is crucial to our activities in such environment. Environment is the totality of the places and surroundings, in which we live, work and interact with other people in our cultural, religious, political and socio-economic activities for self-fulfilment and advancement of our communities, societies or nations (Hodgson, 2002). The Federal Environmental Protection Agency (FEPA) defines environment broadly to include water, air, land and all plants and animals living therein or any of them. All life that has survived must have adapted to conditions of its environment. Temperature, light, humidity, soil nutrients, etc, all influence any species within any environment. It is within this environment that both natural and man-made things are found.

There is a need to maintain a balance in the activities of the environment so that none of them interferes with or hinder the operation of the other. In view of the importance attached to a healthy environment, Okpara (2010) maintained that a conscious attempt to promote the positive effect of social action on environment and minimizes the negative ones become imperative. This can be done through a detailed understanding of the components of our environment and how they interrelate so that the overall balance can be restored (where it has been upset) and enhanced to continue supporting life. Concerned citizens have the right and obligation to contribute towards the solution of some pressing environmental problems facing our country.

Pollution can also be described as the addition of any substance or form of energy (e.g., heat, sound, and radio activity) to the environment at a rate faster than the environment can accommodate it by dispersion, breakdown, recycling, or storage in some harmless form (Emilse & Marina, 2014). Not surprising, over the last two decades there has been widespread agreement that mankind is faced with environmental crisis of an alarming dimension which trend if not reversed or slowed down may lead inevitably to unmitigated decline in the global ecosystems which sustains human life on this planet.

There are several problems threatening the environment of tertiary institutions in Imo state. These problems are regarded as environmental challenges and have to be adequately addressed to enhance successful study in these institutions. commenting on the challenges facing the environment, Ngozi-Olehi, Atama and Okenyi (2011) maintained that until recently, there was little awareness about the fact that damage to one part of the environment, be it living or non-living can affect other parts of the environment in subtle and unknown ways. The dramatic change in perception of the international development community towards addressing environmental problems stemmed from the fact that environmental problems are trans-national issues that must be addressed jointly by the developed and developing nations.

Similarly, Zabbey (2011) pointed out that some of the domestic environmental problems in Nigeria have major international implications. For instance, the frequency of noise pollution in tertiary institutions obstructs proper instruction which leads to low comprehension by students. Low comprehension of students leads to shallow memory which manifests in poor performance in academics, poor achievement of students in tertiary institutions leads to low rating of such institutions at national and global ranking. This has severe implications on the viability of the products of such institution at the labour market.

Noise pollution is one of the most serious environmental challenges in tertiary institutions in Nigeria and Imo state in particular. The increase of students admitted into higher

institution occasioned by rush for everyone to attain literacy and white collar job has resulted in noise pollution which is unhealthy for teaching and learning. Noise pollution is one of the most serious environmental challenges facing man in this present generation. According to Sapina, Sianna, Victoria and Andrew (2014), noise pollution is the disturbing noise with harmful impact on the activity of human or animal life. Noise is unwanted sound judged to be unpleasant, loud or disruptive to hearing. It affects both health and behaviour, and could cause hypertension, hearing loss, and sleep disturbance. Bentler (2000) stated that noise becomes unwanted when it either interferes with normal activities such as sleep, conversation or disrupts one's quality of life.

The increase in population and concentration of people in a particular area or habitat has led to the generation of noise to an extent that it distorts the peaceful existence and performance of normal activities. Noise pollution constitutes a lot of danger and hazard to learning by students and the education system generally. Noise prevents the free flow of information from the teacher to the learner during instruction and consequently disrupts the knowledge of learner. In a noisy classroom environment, both students and teachers find it difficult to achieve the aim of the instructional process. According to Abdolreza and Amir (2016), loudness of sound which is also known as sound pressure level is measured in units called decibels (dB). The normal human ear detects sounds that range between zero (0) dB (hearing threshold) and 140 dB, with sounds between 120dB and 140dB causing pain (pain threshold).

Environmental pollution which noise is one of them is the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environment processes are adversely affected (Sheild & Greenland, 2010). Noise pollution is the disturbing or excessive noise that may harm the activity or balance of human or animal life. The word noise is conveniently and concisely defined as unwanted sound that creates annoyance and interferes in conversation, disturbs sleep and teaching-learning process, reduce work efficiency, causing stress and challenge to humans and it is a silent killer problem grouping day-by-day.

Smaldino and Crandell (2008) referred to noise pollution as the presence of noise or sound in the environment that are disturbing and annoying to living beings. Noise is considered harmful either physically or psychologically.

A survey of the event has shown that most educational institutions are located near busy places such as drive ways, offices and business centers etc. where electricity generating sets are used. These educational institutions suffer from noise pollution which disrupts school activities like teaching, leaning and discussion sessions.

Noise pollution causes unjustifiable interferences and imposition upon human health comfort and quality of human life (Shannon, 2006). Noise pollution in educational environment disturbs the dissemination of information from the teacher to the students during study session. Students cannot concentrate in a noise polluted classroom during

teaching and they may lose interest to study. In school learning, listening is the most important attribute of the students because when the classroom is noisy, communication between students and the teachers is hindered (Picard &Bradley, 2005). The students in school may be exposed to noise from a wide variety of source such as loud speakers, loud music, television sets, radio sets, and discussion by other students, as well as vehicles and motor cycles.

External noise is likely to consist of a range of environmental noise including noise from transportation sources, industrial noise, generator set noise and the noise from people outside the school. An additional source of noise which is reputed to cause significant disturbance to teaching is the noise of rain falling on light weight school roofs.

It has been observed by the researchers as part of their experience in teaching, that no meaningful learning can take place in a noisy school environment. This is in line with the findings of, Crandell and Smaldino (2000) that an evaluation of the interference of noise in the teaching-learning process revealed that students were not able to understand the teacher. Reports from preliminary interview with a section of students revealed that the interference of noise in teaching and learning affects students' grade in both internal and external examination. It is in line with the above facts that the researchers have decided to carry out this investigation on the effects of noise pollution on classroom instruction and students concentration in tertiary institutions in Imo State.

This study specifically focused on;
1) Effects of noise pollution on classroom instruction in tertiary institution in Imo state.
2) Effects of noise pollution on students' concentration in the school library.

Two research questions were generated to guide the conduct of the research. These include:
1) What are the effects of noise pollution on classroom instruction in tertiary institutions?
2) What are the effects of noise pollution on students' concentration in the school library?

2. Research Method

The research design used for this study is the descriptive survey research design. The descriptive survey research design according to Ogwo, Onoja & Egeruoh (2011) elicits relevant information from a portion of the population considered to be a representative of the entire population. The study was conducted in four tertiary institutions out of the six tertiary institutions in Imo State. Two tertiary institutions out of the four schools used are located in the urban areas while the two other higher institutions are located in the rural areas. Imo State is located within longitude 5.6039^0 N and latitude 7.0068^0E. The State is located in the South Eastern part of Nigeria and shares boundary with Abia, Rivers, Anambra and Delta states. The population of the study consists of 68,350 students in the four tertiary institutions in the urban and rural areas of Imo

State. This population is made up of students offering different professional courses in these institutions.

The sample for the research work is made up of 4,000 students drawn by simple random sampling techniques. Specifically, the hat and draw method was used to select the students from the four tertiary institutions in the State. Two instruments were used to elicit information from the students. These are: Questionnaire and guided interview. The questionnaire was designed on a four points Likert-type scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD), and rated as follows; Strongly Agree = 4points, Agree = 3points, Disagree = 2points and Strongly Disagree = 1point. The guided interview was designed on a two point's scale of Yes or No. The instruments were validated by three experts drawn from science education, psychology, measurement and evaluation. The instruments were modified according to the comments of the validators. Some items were removed while other items were restructured.

Pilot study was conducted on few students that were not used for the real study to establish the reliability of the instruments. The instruments were administered to the respondents using research assistants. Data collected for the study were analyzed using mean(x) and standard deviation (SD) to answer the research questions.

Presentation and Analysis of Data
The data collected for the study were collated, analyzed and presented in tables alongside the research questions. Data were interpreted alongside the tables.

Research Question 1: What are the effects of noise pollution on classroom instruction in tertiary institutions in Imo State?

Table 1: Analysis of Effects of noise pollution on classroom instruction in tertiary institutions in Imo State

Item	SA	A	D	SD	$\overline{X}$	SD	Decision
1) Noise distracts free flow of information from lecturers to the students	3000	580	300	200	3.63	1.75	Positive
2) Students cannot pay attention to lectures in a noisy environment	3080	600	300	100	3.70	1.76	Positive
3) Noisy classroom obstructs the achievement of the lesson specific objectives	1980	1590	400	200	3.42	1.92	Positive
4) Coverage of planned lesson is difficult in noisy classrooms	2180	1100	650	150	3.36	2.00	Positive
5) Students that are hard of hearing find it difficult to hear clearly in a noisy classroom	1880	1900	250	50	3.44	1.65	Positive
Cluster Mean						**3.51**	**1.81**

The result of data analysis presented in Table 1 on the effect of noise pollution on classroom instruction in tertiary institutions in Imo State shows that the mean of all the items is greater than the cut-off mean of 2.50. The cluster mean of 3.51 is also an indication that noise distract free flow of information from lectures to students, Students cannot pay attention to lectures in a noisy environment, noisy classroom obstructs achievement of lesson specific objectives, coverage of planned lesson is difficult in noisy classroom and students that are hard of hearing find it difficult to hear clearly in a noisy classroom.

Research Question 2: What are the effects of noise pollution on students' concentration in the school library?

Table 2: Effects of noise pollution on students' concentration in the school library

Item	SA	A	D	SD	$\overline{X}$	SD	Decision
1) Noise lower students' interest in the classroom	3050	680	200	150	3.36	1.85	Positive
2) Noise reduce the level of students participation in the class activities.	1180	1900	250	750	2.91	1.65	Positive
3) Noise interferes with comprehension capacity of students.	1380	1700	300	700	2.98	2.05	Positive
4) Noise reduce the ability of students to memorize the content of the lesson.	1680	2000	150	250	3.31	1.70	Positive
5) Noise irritates students in the classroom.	1480	1399	501	700	2.82	1.90	Positive
Cluster Mean						**3.07**	**1.83**

The result of data analysis presented in Table 2 on the effect of noise pollution on students' concentration shows that the mean of all the items is greater than the cut-off mean of 2.50. The cluster mean of 3.07 is also an indication that noise lowers students' interest in the classroom, reduces the level of students' participation in class activities, interferes with comprehension capacity of students, reduces the ability of students to memorize concepts and irritates students in the classroom.

3. Discussion of Findings

This study investigated the perceived effects of noise pollution on classroom instruction and students concentration in tertiary institutions in Imo State. The findings are discussed based on the result of data analysis.

Effects of noise pollution on classroom instruction in tertiary institutions in Imo State
The result of data analysis presented in Table 1 on the effect of noise pollution on classroom instruction in tertiary institutions in Imo State shows that the mean of all the items is greater than the cut-off mean of 2.50. The cluster mean of 3.51 is an indication that noise distract free flow of information from lectures to students, Students cannot pay attention to lectures in a noisy environment, noisy classroom obstructs achievement of lesson specific objectives, coverage of planned lesson is difficult in noisy classroom and students that are hard of hearing find it difficult to hear clearly in a noisy classroom. This finding is in conformity with the view of Hodgon (2002) that speech perception varies according to the voice level used by teachers. A fact that cannot be disregarded nor forgotten is the reverberation that occurs inside a chosen space, such as classrooms. It is important to ascertain the characteristics of the teacher's

voice, the distance between the teacher and the students, the kind of desk distribution in the classroom and the ventilation setting of the classroom. Reverberation and noise control the speech intelligibility in a classroom. The characterization of the noise that occurs inside the classroom is important so that we can have a notion of the spectrum of the noise to know whether it is high. The result of the study is also in line with the findings of Abdolreza and Amir (2016) who discovered that noise in educational institutions have negative impact on learning and academic achievement of elementary school students. Managers of schools are advised to remove or reduce noise in educational environment. The responses of students from the guided interview on how noise interferes with classroom instruction reveal that students are not comfortable to receive instruction in a noisy classroom. Noise prevents the students from hearing the teacher clearly.

Effects of noise pollution on students' concentration in the classroom

The result of data analysis presented in Table 2 on the effect of noise pollution on students' concentration shows that the mean of all the items is greater than the cut-off mean of 2.50. The cluster mean of 3.07 is an indication that noise lowers students' interest in the classroom, reduces the level of students' participation in class activities, interferes with comprehension capacity of students, reduces the ability of students to memorize concepts and irritates students in the classroom. This result agrees with the findings of Emilse and Marina (2014) that noise leads to difficulty in concentration and irritation which interferes with learning. Noise has been identified by students as a harmful factor that interrupts the free flow of information in the process of teaching and learning. The result of the study also conforms to the findings of Shannon (2006) that students in environment of absolute silence performed better than those in the music group. Quiet environment was therefore recommended for meaningful learning to take place. Background or low level noise in the school environment and classroom disrupts students' concentration. Commenting on the effect of noise on students concentration, Philip (2014) pointed out that ongoing noise in the environment can induce the release of cortisol, a hormone that helps to restore homeostasis in the body after bad experience. Excess cortisol impairs function in the prefrontal cortex; an emotional learning centre that helps regulates executive functions such as reasoning, planning and impulse control. Changes to the prefrontal cortex disrupt a person capacity to think clearly and to retain information. The result of the response from respondents on the guided interview shows that students are distracted by noise during class activities which reduce their comprehension ability.

4. Conclusion

The following conclusions were made based on the findings of the study:

1) The result of the study provides empirical evidence that noise pollution has negative effects on the academic performance of students in tertiary institutions.
2) Noise interferes with classroom instruction by; distracting free flow of information from lecturers to students, distracting students attention to lectures,

obstructing achievement of lesson specific objectives, making it difficult for coverage of planned lesson and placing hard of hearing students in a difficult condition to hear the teacher clearly.
3) Noise lowers students' interest in the classroom, reduces the level of students' participation in class activities, interferes with comprehension capacity of students, reduces the ability of students to memorize concepts and irritates students in the classroom

5. Recommendations

The following recommendations were made based on the findings of this research:
a) Power generating plant should be located in an area that is far from lecture halls.
b) Students' parks should be created so that students can stay there when they do not have lectures.
c) School management should avoid congesting lecture halls in a particular area. Lecture halls should be spaced to avoid interference of sound during teaching and learning.
d) All elements in the school environment that interferes with classroom instruction should be eliminated to enhance free flow of information.

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