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Noisy School Environments in Port Harcourt Metropolis: Implications for the Performance and Health of Physics Teachers and Students.

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Abstract
The aim of this study was to examine the effects of noise pollution on teaching and learning of physics and also on the health of physics teachers and students in secondary schools in Port Harcourt metropolis of Rivers state. The descriptive survey method was used to achieve this. Purposive random sampling method was used to draw a sample of two hundred and eighty (280) physics students and twenty-two (22) teachers from 28 schools in Port Harcourt metropolis for the study. Three research questions and four null hypotheses guided the study. A validated questionnaire titled 'Effect of Noise Pollution Questionnaire' (ENPQ) with a reliability coefficient of 0.70 was used to collect data for the study. The data were analyzed using percentages, standard deviation, and Chi-square. The research findings showed that noise pollution affects the teaching and learning of physics greatly. Besides the interference in the communication process between the teacher and students during physics lessons, and the negative health implications on the teachers and students, noise pollution was also found to negatively affects the job performance of the teachers, as well as the concentration and performance of students. It is therefore recommended that the government, school proprietors and intending school proprietors ensure that schools are cited away from noise prone areas.
Keywords: Noise pollution, School environments, Teaching and learning of physics, Health implications.

Introduction

One of the persistent and unavoidable menace that is facing the contemporary society today is that of noise pollution. This is due to the great civilization and industrialization of our society in which the number of automobiles, generating plants, industries and other noise generating sources are ever increasing. Onuu (2014) laments that in developed countries, it is a challenge to get a quiet place out of five places while in Africa, noise is seen as a way of life and a necessary consequence of urbanization. With the surge to urban areas, about 95% of the population is exposed to noise above 50dB. This is because in the urban centers, shops are located on nearly all major streets and noise is generated by sources like traffic from dawn to dusk and noise blasting record selling shops at the busy city centers.

The word Noise is derived from the Latin word “Nausea” which implies unwanted sound. Kiely (1996) considered noise as the wrong sound in the wrong place at the wrong time. It is an unpleasant or undesired sound. It is any unwanted distortion which constitutes a modern plague (Onuu, 2014). Pollution refers to substances that make air, water, soil e.t.c. impure and dangerously dirty. From the foregoing, noise pollution could therefore be seen as an unwanted and dangerous sound which makes the environment impure. Noise could be generated by manmade sources like traffic, humans, animals, devices and appliances like generating plants, fans and typewriters. It could also be generated by natural sources like heavy rainfall, thunder and earthquake. Sources of most outdoor or environmental noise are transportation systems, e.g. motor, trains, and airplane. Indoor noise can be caused by gadgets like television, washing machine, grinder, pressure cookers. Noise is measured by the intensity and frequency of sound waves. The unit used to measure the volume of sound is the decibel dB(A).

Sound is considered noise pollution when it adversely affects wildlife and human activities or capable of damaging physical structures. Sound is also considered noise pollution when it disrupts the natural rhythm of life or cause human harm. Noise pollution takes place when there is excessive amount of sound or an unpleasant sound that causes temporary disruption in the natural balance. Damage risk is imminent when humans and animals are exposed to noise at harmful levels of 85dB and above. Effects of noise can be physiological, psychological and social. Noise (unwanted sound) creates annoyance and interferes in conversation, disturbs sleep, disrupts teaching and learning process, reduce work efficiency, causing stress and challenge to public health (Wikipedia, 2015). According to the National institute for occupational safety and health “ambient noise level also affect people’s health by increasing general stress or related conditions such as high blood pressure, coronary artery disease, peptic ulcer and migraine head ache” (Andrews, 2009). High noise level can contribute to cardiovascular disturbances in humans, vasoconstriction, cause sleep disorder, impair, cause trouble in communication, impairs task performance, disturb mental health and stimulate negative social behaviour like annoyance and aggression (Goines and Hagler, 2007). In animals, noise can increase the risk of death by altering predators or prey detection and avoidance. It interferes with reproduction and contributes to permanent hearing

loss which makes them prey and leads to dwindling population. Noise pollution affects the health and behavior of humans and animal.

Obafemi (2006) found high level of noise of 81.8 dB(A) during working hours in institutional land use in Port Harcourt. Similarly, Ugorji (2012) revealed that 83.8% of the sampled schools in Port Harcourt metropolis had a very high level of noise of an average of 84.92 dB (A) during the school hours. In the same vein, out of the schools sampled by Ofondu (2015) in Port Harcourt metropolis, only (10.7%) had noise level values less than 50 dB(A) during school hours. Ana, Shendell, Brown and Sridhar (2009) also reported high level noise in school environments. They found that noise pollution constitute disturbance, causes tiredness and lack of concentration. Debnath, Nath and Barthakur, (2012) reported very high level of noise pollution around educational institutions in India which produces multi problems to the teaching-learning process. This is not suitable for teaching and learning process because it negatively affects the performance of both teachers and students. Guidini, Bertoncello, Zanchetta, & Dragone (2012) discovered high level of noise in the schools, which made the teachers raise their voices during lessons. This is evidenced in their results that indicated that 70% of teachers had vocal problems and 90% of them had vocal strains of different degrees. A significant correlation was thus found between the intensity of teachers' voice and the environmental noise during the class in the presence of the children. Ibrahim and Richard (2000) in a study of noise pollution at schools located in residential areas in Sekolah Kebangsaan Sri Skudai, found a very high level of noise which is not conducive for learning and consequently had a negative effect on the students' performance. Evans and Maxwell (1997) found that children in noisy schools had poorer reading skills than children from quiet schools. Obafemi (2006) found that 60% of the respondents do not enjoy noise, over 50% of the respondents agree that noise causes annoyance, irritation, disturbs sleep, gives head ache, distort speech, instills fear and causes emotional imbalance. However, less than 50% agree that noise causes loss of hearing, fatigue and stress while 43% of the respondents agree that noise negatively affect human health.

The word Physics can be traced back to the Greek word phusika meaning natural things. Physics is a branch of science concerned with the nature and properties of matter and energy. It is the general analysis of nature conducted in order to understand how the universe behaves. Physics is one of the oldest academic discipline perhaps the oldest through the inclusion of astronomy. Physics intersects with many interdisciplinary areas of research such as biophysics and quantum chemistry and the boundaries of physics are not rigidly defined. New ideas in physics often explain the fundamental mechanism of other sciences.

Physics makes significant contribution in the society through advances on new technologies that arise from theoretical break through. Advances in the understanding of electromagnetism or nuclear physics led directly to the development of new products which have dramatically transformed modern day society such as television, computers, domestic appliances and nuclear weapons. Advances in thermodynamics led to the development of industrialization. Researchers use the ultra powerful x-ray beams of dedicated synchrotron light sources to create the brightest light on earth. These luminous sources provide tools for such application as protein structure analysis, pharmaceutical research, material science and restoration of works of art. Particle physicist developed the world wide web (www) to share information quickly and effectively with colleagues around the world. In medicine, diagnostic instrumentation and technique for medical application. Biomedical scientists use particle physics technologies to decipher the structure of protein, a clearer understanding of protein structure allows for the development of more effective drugs such as kalestra, one of the world's most prescribed drugs to fight AIDS. Physics is an essential part of the educational system and of technologically advanced society. This is because of its role in building a good foundation for prospective engineers, scientists, information and communication technologists, medical personnel e.t.c.

Isola (2010) cited in Oladejo, Olosunde, Ojebisi and Isola (2011) noted that, according to the Nigeria Educational Research and Development Council (NERDC), physics as one of the science subjects remains one of the most difficult subjects in the school curriculum. Physics is perceived to be a difficult subjects because of its abstract and mathematical nature (Reiner, Slotta, Chi & Resnick, 2000; Obafemi, 2005, Adegoke, 2009; Akatugba & Wallace, 2009). Many researchers have shown that secondary school students are exhibiting dwindling interest in physics (Esiobu, 2005). Studies, have revealed that over the years, academic performance of Nigerian students in Senior Secondary School Examination (SSCE) physics has been generally and consistently poor (Omosewo, 1999, Obafemi, 2012). The poor performance of physics students in Senior Secondary schools has been attributed to some factors by researchers. Research has revealed that students' academic problems arise from anxiety, environmental influences such as poor classroom condition, curricular inadequacies, noise pollution and abstract nature of physics (Omosewo, 1999).

Considering the nature of physics which demands a very high level of concentration, how do physics teachers and students cope in a noisy environment?. Could the teaching and learning of physics be affected by noise pollution? How does noise pollution affect the concentration and assimilation of students during physics lesson? Could the performance of students in physics be affected by noise pollution? How does school location affect the teaching and learning of physics? What is the effect of noise pollution on the health of physics teachers

and students? It is in view of these above mentioned issues that this research investigated the effect of noise pollution on the teaching and learning of physics in secondary schools in Port Harcourt.

Purpose of the study

The purpose of this study is to investigate the effect of noise pollution on the teaching and learning of physics. The specific objectives of the study are as follows:

1. To determine how noise pollution affects the teaching and learning of physics.
2. To investigate the health implications of noise pollution on physics teachers and students.
3. To ascertain measures of abating noise pollution in and around school environment.

Research Questions

The following research questions guided the study:

1. How does noise pollution affect the teaching and learning of physics?
2. What are the health implications of noise pollution on physics teachers and students?
3. What possible measures could be taken to abate noise pollution in and around school environment?

Research Hypotheses

The following null hypotheses, which were formulated for this study were tested at 0.05 level of significance:

1. There is no significant difference among physics teachers in the different land uses in their perceptions of the effects of noise pollution on the teaching and learning of physics.
2. There is no significant difference among students in the different land uses in their perceptions of the effect of noise pollution on the learning of physics.
3. There is no significant difference among physics teachers in the different land uses in their perceptions of the effect of noise pollution on the health of physics teachers.
4. There is no significant difference among students in the different land uses in their perceptions of the effect of noise pollution on the health of physics students.

Research method

The descriptive survey method was adopted for the study. Random sampling method was used to draw a sample of two hundred and eighty (280) Senior Secondary School (SS1 and SS2) physics students physics students and twenty-two (22) physics teachers from 28 secondary schools. The secondary schools were purposively selected from Port Harcourt metropolis (consisting of Port Harcourt and Obio/Akpor Local Government Areas of Rivers state) based on selected land uses namely Transportation, Commercial, Residential and Airport land uses. The research instrument was a validated questionnaire titled 'Effect of Noise Pollution Questionnaire' (ENPQ). A reliability coefficient of 0.70 was obtained for the instrument using Cronbach alpha formula. The instrument was used to gather information from physics teachers and students on their perceptions of the effect of noise pollution on the teaching and learning of physics and on health implications. The instrument consist of two sections. Section A is designed to elicit respondents' demographic information such as age, gender, class, location of school, teaching experience etc. Section B contains statements addressing the effects of noise pollution on teaching and learning of physics with responses based on Likert four point scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) which were scored 4, 3, 2 and 1 points respectively. The research questions were answered using mean (based on a criterion mean of 2.50), percentages and standard deviation while the hypotheses were tested using Chi-square and ANOVA.

Results and Discussions

Research Questions

Research Question 1: How does noise pollution affect the teaching and learning of physics?

Table 1 reveals that all the items are effects of noise pollution on the teaching and learning of physics from the perspectives of physics teachers. This is due to the fact that the mean values of all the items are greater than the criterion mean value of 2.5. In other words, noise pollution prevents effective communication during physics lessons, makes physics teachers shout during lessons so students could hear, makes teachers lose concentration during teaching, disrupts physics lessons, makes students lose concentration and reduces students' rate of assimilation during physics lessons.

Table 2 reveals that items 1 and 2 were rejected since their mean values are less than the criterion mean value of 2.5. This indicates that students cannot effectively read physics in a noisy environment nor understand physics lesson in a noisy environment. Items 3 to 8 were all accepted since their mean values are greater than the criterion mean value of 2.5. In other words, from the perspectives of physics students, noise prevents effective communication during physics lessons, prevents students from hearing the teacher well during physics lessons, disrupts physics lessons, makes students lose concentration, reduces students' rate of

assimilation during physics lessons and makes students get low scores in physics.

These findings are so because noise can mask communication between the source and the receiver. Also, if the concentration and assimilation of students are hindered, their performance will definitely be negatively affected. This finding agrees with that of Ana, Shendell, Brown & Sridhar (2009) who found that noise pollution constitute disturbance, causes tiredness and lack of concentration. Also in agreement are the findings of Goines and Hagler (2007) found that noise interferes with communication and concentration. They conform with Obafemi (2006)'s findings that schools located along expressways or very busy roads within the metropolis as well as those along aircraft flight paths experience severe distractions to learning. They also conform with the findings of Ugorji (2012) who discovered that noise disturbs teaching and learning and also negatively affect students' performance. Evans and Maxwell (1997) found that children in a noisy school had poorer reading skills than children from quiet schools, as well as Ibrahim and Richard (2000) who found that noise negatively affects the performance of students.

Table 3 shows that 68.18%, 63.64% and 77.23% of the physics teachers perceive noise pollution as bad, irritating and distracting respectively while 71.78% and 69.64% of the students perceive noise pollution as irritating and distracting respectively. However, only 43.57% of the students perceive noise pollution as bad. This finding may be due to the home environment of the students which may have made them accustomed to noise. It is however noteworthy that the physics teachers considered noise as bad unlike most of the students. This may be because higher levels of concentration and tranquility are needed for good job performance by the teachers which may be hindered by noise.

These findings agrees with Ugorji (2012)'s discoveries that teachers and students perceive noise as bad because it leads to burn out, it is distracting and irritating. These findings also conforms with Obafemi (2006)'s findings that the respondents from highly populated areas, the commercial vehicle drivers with gigantic loud speakers in their vehicles and the traders in the market are not disturbed by noise but 'feel high' and 'get very lively' because noise is what makes their environment. Ugorji (2012) similarly found that the percentage of students who perceive noise as normal is higher than the teachers who perceive noise as normal.

Research Question 2: What are the health implications of noise pollution on physics teachers and students?
Table 4 reveals that all the items are health implications of noise pollution from the perspectives of physics teachers. This is due to the fact that the mean values of all the items are greater than the criterion mean value of 2.5. In other words, noise pollution causes stress, gives them headache, fever, cracked voice as a result of shouting, makes them aggressive, tired, annoyed and psychologically affect them.

Table 5 reveals that from the perspectives of physics students, items 1,2,3 and 6 are accepted as health implications of noise. This is due to the fact that the mean values of the items are greater than the criterion mean of 2.5. This indicates that noise pollution gives the students headache and ear ache, it also makes them restless and annoyed. However, the students did not perceive items 4 and 5 as health implications of noise pollution. This is due to the fact that the mean values of the items are less than the criterion mean of 2.5. In other words, noise pollution does not give them fever nor make them aggressive.

These findings agree with that of Guidini, et.al. (2012) who discovered high level of noise in the schools, which made the teachers raise their voices during lessons. This is evidenced in their results that indicated that 70% of teachers had vocal problems and 90% of them had vocal strains of different degrees. A significant correlation was thus found between the intensity of teachers' voice and the environmental noise during the class in the presence of the children. Ana, Shendell, Brown & Sridhar (2009) similarly found negative effects of noise on health. The findings also conform with Ugorji (2012)'s finding that 53% of the teachers had to shout during lessons because of noise, teachers and students get tired, annoyed and aggressive. Noise gives them headache, stress and burn out though more students get tired than teachers while more teachers get annoyed than students because of noise.

Research Question 3: What possible measures could be taken to abate noise pollution in and around school environment?
Tables 6, 7 and 8 revealed that physics teachers and students are of the view that to abate the menace of noise pollution in schools, schools should not be located at busy centers, sound proof materials should be used in building schools while noise generating facilities should not be kept close to the classrooms. Furthermore, they are of the view that schools should be located at appropriate sites, noise generating facilities should be reduced in schools, students population per class should be reduced. They are also of the view that the government should make appropriate legislation against noise pollution in and around schools.

These findings agrees with Obafemi (2006) who found that 72% of respondents agreed that environmental laws and regulations should be enforced, 58% agreed that compliance with noise standards should be monitored, 59% agreed that new constructions and development activities should be regulated, 62% agree that proper planning and efficient land use be ensured. The findings also conform with and Ugorji (2012) who found

that teachers and students agree that there is a need to regulate noise inducing facilities in schools, legislate against noise in school environment, reduce population of students in classrooms and site schools at appropriate locations.

Research Hypotheses

Research Hypothesis 1: There is no significant difference among physics teachers in the different land uses in their perceptions of the effect of noise pollution on the teaching and learning of physics.

Table 1 shows that there is a significant difference among the teachers in the different land uses on reduction of students' performance in physics due to noise pollution. The post hoc analysis of the responses on item 8 on Table 1 indicates that physics teachers in the commercial land use contributed most to the significant difference. This may be because commercial land use experiences high population density from which high level of noise is generated. This result agrees with Obafemi (2006) who found that commercial land use zone was found to be most noisy because of the high population density while the low density area generated the least noise. There is however no significant difference among the teachers in the different land uses on prevention of effective communication, shouting during teaching, loss of concentration during teaching, disruption of lessons, loss of concentration in students and reduction of rate of assimilation during physics.

Research Hypothesis 2: There is no significant difference among students in the different land uses in their perceptions of the effect of noise pollution on the learning of physics.

Table 2 shows that there is a significant difference among the students in the different land uses on effective reading of physics in a noisy environment and disturbance during physics lesson. The post hoc analysis revealed that physics students in the transportation land use contributed most to the significant difference on the effective reading of physics in a noisy environment while the physics students in the residential land use contributed most to the significant difference on the disturbing effect of noise pollution during physics lesson. This may be due to the high level of noise generated by moving vehicles, commercial vehicles seeking passengers using loud voices, e.t.c. This finding conforms with that of Obafemi (2006) who found that during the school hours, transportation and commercial land use were found to be the chief sources of noise in Port Harcourt metropolis. Consequently, schools located along expressways or very busy roads within the metropolis as well as those along aircraft flight paths experience severe distractions to learning. There is however no significant difference among the students in the different land uses on the ability to understand physics lesson in a noisy environment, prevention of effective communication between teacher and students during physics lesson, loss of concentration, reduction of rate of assimilation during physics and low performance in physics.

Research Hypothesis 3: There is no significant difference among physics teachers in the different land uses in their perceptions of the effect of noise pollution on the health of physics teachers.

Table 4 shows that there is no significant difference among the teachers in the different land uses on all the health implications of noise pollution listed on table 4. Irrespective of the land use in which their schools are located, the teachers agree that noise has negative impacts on their health which in turn adversely affect their job performance.

Research hypothesis 4: There is no significant difference among students in the different land uses in their perceptions of the effect of noise pollution on the health of physics students.

Table 5 shows that there is significant difference among the students in the different land uses on items 1 and 2 (Head ache and Restlessness) as health implications of noise pollution. Post hoc analysis revealed that physics students in the residential land use contributed most to the significant difference concerning the two items. This may be due to the high population density of the residential areas in which the schools are located, the nearness of power generating plant used in the school and noise from over populated classrooms. There is however no significant difference among the students in the different land uses on the health implications of noise pollution listed in items 3,4,5 and 6 (Ear ache, fever, aggression and annoyance).

Implications of findings

Physics, because of its abstract, mathematical and perceived difficult nature, is a subject which requires a serene and conducive environment for its teaching and learning void of noise pollution. No matter how qualified, good and prepared a physics teacher is for a physics lesson, disturbance or interference from noise pollution will render his effort useless. If the problem of noise pollution within and around the school environment is not tackled head long, all the negative effects of noise pollution on the teaching and learning of physics and on the health of teachers and students will continue to abound. This may adversely affect the job performance of the teacher, culminating in poor performance of students in physics. On the contrary, a serene school and classroom environment will enhance the job performance of physics teachers and the performance of students in physics.

Conclusion

The study revealed that noise pollution affects the teaching and learning of physics greatly. It affects the teacher by preventing effective communication between physics teachers and students, making the teachers shout while teaching so that students could hear, making teachers to lose concentration during teaching and disrupting physics lessons. It also affects the students by preventing the students from hearing the teacher, reducing their rate of concentration, assimilation and their performance in physics. Noise stresses the teachers up, gives the teachers and students head ache and ear ache, makes the teachers have cracked voice as a result of shouting, makes them tired, annoyed and restless.

From the findings of this study, noise pollution could therefore be seen as an unwanted and undesirable sound that makes the teaching and learning environment impure by contaminating and distorting the teaching and learning process, having adverse psychological and health effects on physics teachers and students. Effort must therefore be made to abate and curb this urban menace in order to have an effective process of physics teaching and learning in schools.

Recommendations

Based on the findings of this study, the following are recommended:

1. There should be an increasing awareness about how the physical environment of the school affects teaching and learning.
2. Appropriate planning should be done by the government, existing and intending school proprietors in terms of site selection, building materials, capacity of the schools in terms of population, class size, etc so that the teachers and students will have a conducive environment free from noise pollution for teaching and learning of physics.
3. School buildings should have sound insulation system and high fence using concrete walls which can prevent noise from outside.
4. Proper legislation should be made and pursed for effective implementation in eliminating noise within and around the school environment.

References

Adegoke, B.A. (2009). Determining factors in secondary school students' choice of physics. *Journal of Science Teachers' Association of Nigeria*. 4(1&2), 75-84.

Ana, G.R.E.E., Shendell, D.G., Brown, G.E. and Sridhar, M.K.C. (2009). Assessment of noise and associated health impacts at selected secondary schools in Ibadan, Nigeria. *Journal of Environmental and Public health*. Retrieved on 1st July 2015 from www.hindawi.com/journals/jeph/2009/739502/

Andrew, A.W. (2009). How does background noise affect our concentration?. Retrieved on 1st July, 2015 from *www.scientificamerican.com/article/ask-the-brain-background-noise/*

Akatugba, A.H. & Wallace, J. (2009). An integrative perspective on students' proportional reasoning in high school physics in a West African context. *International Journal of Science Education,* 31(11), 1473-1493.

Debnath, D., Nath, S.K. & Barthakur, N.K. (2012). Environmental noise pollution in educational institutes of Nagaon town, Assam, India. *Global Journal of Science Frontier Research, Environment and Earth Sciences,* 12(1), 1-6.

Esiobu, G.O. (2005). Genre issues in science and technology education development. In Uvowi, U.M.O. (Ed.) *Science and technology education for development*. Lagos: NERDC Press.

Evans, G.W. and Maxwell, L. (1997). Chronic noise exposure and reading deficits, the mediating effects of language acquisition. *Environment and Behaviour,* 29(5), 638- 656.

Goines, L. and Hagler, L.(2007). Noise pollution: A modern plague. *Southern Medical Journal,* 100(3), 287-294.

Ibrahim, Z. and Richard, H.K. (2000). Noise pollution at school environment located in residential area. *Journal of Civil Engineering*, 12(2), 47-62.

Kiely, G. (1996). *Environmental Engineering.* Berkshire, England: McGraw Hill Publishers.

Obafemi, A.A. (2006). *Spatio- Temporal analysis of noise pollution in Port Harcourt metropolis.* Unpublished doctoral dissertation, University of Port Harcourt.

Obafemi, D. T. A. (2005). A comparative analysis of attitudes towards physics in the University Demonstration and Unity secondary schools in Rivers State. Unpublished M.Ed Thesis, University of Port Harcourt.

Obafemi, D.T.A. (2012). *Teaching difficult physics concepts for optimum performance of secondary school students in Ikwerre L.G.A. of Rivers state*. Unpublished doctoral dissertation, University of Port Harcourt.

Ofondu, N.F. (2015). *Effects of noise pollution on the teaching and learning of physics in secondary schools in Port Harcourt L.G.A. & Obio Akpor L.G.A. Rivers state.* Unpublished undergraduate project, University of Port Harcourt.

Oladejo, M.A., Olosunde, G.R., Ojebisi, A.O., Isola, O.M. (2011). Instructional materials and students' academic achievement in physics: Some policy implications. *European Journal of Humanities and Social sciences*. 2(1), 112-126.

Omosewo, E.O. (1999). Relative effects of planned post-laboratory discussions on students achievement in physics. *Journal of Educational Foundations*. 4(2), 116-121.

Onuu, M.U. (2014). *Noise and noise pollution: Harmful doses, effects, community reactions and control.* Paper presented at workshop for science teachers held between 16th and 23rd October, 2014 at National Mathematical Center, Abuja, Nigeria.

Guidini, R.F., Bertoncello, F., Zanchetta, S. & Dragone, M.L.S. (2012). Correlations between classroom environmental noise and teacher's voice. *Revista da Sociedade Brasileira de Fonoaudiologia (online), 17(4), 398-404.*

Reiner, M., Slotta, J.D., Chi, M.T.H., & Resnick, L.B. (2000). Naive physics reasoning: A commitment to substance-based conceptions. *Cognition and Instruction.* 18(1), 1- 43.

Ugorji, O.M. (2012). *Effects of noise pollution on learning in Port Harcourt*. Undergraduate project of University of Port Harcourt.

Wikipedia (2015). Noise pollution. Retrieved on 1st July 2015 from *https://en.wikipedia.org/wiki/Noise_pollution*

Table 1: Teachers' perception of the effect of noise pollution on the teaching and learning of physics

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Prevents effective communication.	20 (90.90)	1 (4.50)	1 (4.50)	0 (0.00)	85	22	3.86	0.47	Accepted	1.26	9.49	ns
2	Shouting so that students could hear.	21 (95.45)	1 (4.50)	0 (0.00)	0 (0.00)	87	22	3.95	0.21	Accepted	0.60	5.99	ns
3	Loss of concentration during teaching.	19 (86.36)	2 (9.10)	1 (4.50)	0 (0.00)	84	22	3.82	0.50	Accepted	1.99	9.49	ns
4	Disruption of physics lesson.	19 (86.36)	2 (9.10)	0 (0.00)	0 (0.00)	82	21	3.90	0.30	Accepted	1.36	5.99	ns
6	Loss of concentration in students.	20 (90.91)	2 (9.09)	0 (0.00)	0 (0.00)	86	22	3.91	0.29	Accepted	1.26	5.99	ns
7	Reduction of students' rate of assimilation.	19 (86.36)	3 (13.64)	0 (0.00)	0 (0.00)	85	22	3.86	0.35	Accepted	1.99	5.99	ns
8	Reduction of students' performance.	14 (63.64)	8 (36.36)	0 (0.00)	0 (0.00)	80	22	3.64	0.51	Accepted	10.89	5.99	s

Figures in parentheses are percentages

Table 2: Students' perceptions of the effect of noise pollution on the learning of physics

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Read physics effectively in a noisy environment.	5 (1.79)	6 (2.14)	166 (59.29)	103 (36.80)	473	280	1.69	0.28	Rejected	34.40	16.92	s
2	Understand physics lesson in a noise environment.	2 (0.71)	4 (1.42)	119 (42.5)	155 (55.40)	413	280	1.48	0.56	Rejected	16.62	16.92	ns
3	Prevents effective communication during physics lesson.	64 (22.86)	125 (44.64)	53 (18.93)	38 (13.60)	775	280	2.77	0.95	Accepted	11.73	16.92	ns
4	Prevents me from hearing my teacher well during physics lesson.	69 (24.64)	86 (30.71)	88 (31.42)	37 (13.20)	747	280	2.66	0.99	Accepted	9.11	16.92	ns
5	Disturbance during physics lesson.	40 (14.29)	128 (45.71)	63 (22.50)	49 (17.50)	719	280	2.57	0.94	Accepted	20.64	16.92	s
6	Loss of concentration during physics lesson.	115 (41.07)	94 (26.43)	26 (9.29)	45 (16.10)	839	280	2.99	1.07	Accepted	13.38	16.92	ns
7	Reduction of rate of assimilation during physics lesson.	122 (43.57)	88 (31.42)	40 (14.29)	30 (10.70)	862	280	3.07	1.00	Accepted	11.41	16.92	ns
8	Noise makes me get low scores in physics.	92 (32.86)	131 (42.79)	21 (7.50)	36 (12.90)	839	280	2.99	0.96	Accepted	11.06	16.92	ns

Figures in parentheses are percentages

Table 3: Perceptions of noise pollution by teachers and students.

Noise pollution is	Teachers		Students	
	Responses	Total	Responses	Total
Bad	15 (68.18)	22	122 (43.57)	280
Irritating	14 (63.64)	22	201 (71.78)	280
Distracting	17 (77.23)	22	195 (69.64)	280
Normal	0 (0.00)	22	2 (0.71)	280
Desirable	0 (0.00)	22	0 (0.00)	280

Figures in parentheses are percentages

Table 4: Teachers' responses on health implications of noise pollution

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Stress.	20 (90.90)	1 (4.50)	1 (4.50)	0 (0.00)	85	22	3.86	0.47	Accepted	1.26	9.49	ns
2	Headache.	21 (95.45)	1 (4.50)	0 (0.00)	0 (0.00)	87	22	3.95	0.21	Accepted	0.60	5.99	ns
3	Fever.	7 (31.81)	5 (22.7)	8 (36.40)	2 (9.10)	61	22	2.77	1.02	Accepted	7.27	12.59	ns
4	Cracked voice as a result of shouting.	20 (90.90)	1 (4.50)	1 (4.50)	0 (0.00)	85	22	3.86	0.47	Accepted	2.75	9.49	ns
5	Aggression	16 (72.73)	2 (9.10)	3 (13.60)	1 (4.50)	77	22	3.50	0.91	Accepted	3.54	12.59	ns
6	Tiredness.	20 (90.90)	2 (9.10)	0 (0.00)	0 (0.00)	86	22	3.90	0.29	Accepted	1.26	5.99	ns
7	Annoyance.	21 (95.45)	1 (4.50)	0 (0.00)	0 (0.00)	87	22	3.95	0.21	Accepted	1.99	5.99	ns
8	Psychological effect.	21 (95.45)	1 (4.50)	0 (0.00)	0 (0.00)	87	22	3.95	0.21	Accepted	2.25	5.99	ns

Figures in parentheses are percentages

Table 5: Students' responses on health implications of noise pollution

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Head ache	106 (37.86)	82 (29.29)	59 (21.1)	33 (11.80)	821	280	2.90	1.03	Accepted	26.52	16.92	s
2	Restlessness	92 (32.86)	143 (51.07)	33 (11.8)	12 (4.28)	875	280	3.12	0.77	Accepted	17.06	16.92	s
3	Ear ache	34 (12.14)	164 (58.57)	57 (20.36)	25 (8.90)	767	280	2.73	0.79	Accepted	9.75	16.92	ns
4	Fever	22 (7.85)	55 (19.64)	108 (38.57)	95 (33.90)	564	280	2.01	0.85	Rejected	13.74	16.92	ns
5	Aggression	45 (16.10)	42 (15.00)	101 (36.10)	90 (32.10)	598	280	2.15	1.06	Rejected	6.12	16.92	ns
6	Annoyance	62 (22.14)	87 (31.10)	83 (29.64)	48 (17.10)	723	280	2.58	1.01	Accepted	7.25	16.92	ns

Figures in parentheses are percentages

Table 6: Teachers' perception on the abatement measures of noise pollution

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Schools should not be located at busy centers.	21 (95.45)	0 (0.00)	0 (0.00)	1 (4.50)	85	22	3.86	0.64	Accepted	0.60	5.99	ns
2	Sound proof materials should be used in building schools.	20 (90.9)	0 (0.00)	2 (9.10)	0 (0.00)	84	22	3.81	0.59	Accepted	1.26	5.99	ns
3	Noise generating facilities should not be kept close to the classrooms.	20 (90.9)	0 (0.00)	2 (9.10)	0 (0.00)	84	22	3.81	0.59	Accepted	1.26	5.99	ns

Figures in parentheses are percentages

Table 7: Students' perception of abatement measures of noise pollution

S/N	Items	SA	A	D	SD	Total Score	Respondents	$\bar{X}$	Sd	Decision	χ^2 cal	χ^2 crit	Sig
1	Schools should not be located at busy centers.	165 (58.90)	102 (36.43)	7 (2.50)	6 (2.41)	986	280	3.50	0.66	Accepted	10.64	16.92	ns
2	Noise proof materials should be used in building.	55 (19.64)	111 (39.64)	93 (33.21)	21 (7.50)	760	280	2.71	0.87	Accepted	9.86	16.92	ns
3	Noise generating facilities should not be kept close to classrooms.	120 (42.86)	109 (38.93)	26 (9.29)	25 (8.90)	884	280	3.16	0.93	Accepted	6.66	16.92	ns

Figures in parentheses are percentages

Table 8: Abatement measures of noise pollution.

S/N	Abatement measure of noise pollution	Teachers	Total	Rank	Students	Total	Rank
1	Location of schools at appropriate sites.	19 (86.36)	22	1st	204 (72.86)	280	1st
2	Reduction of noise generating facilities in schools.	12 (54.55)	22	3rd	198 (70.71)	280	2nd
3	Reduction of students population per class	8 (36.36)	22	4th	185 (66.07)	280	4th
4	Government legislation against noise	17 (77.27)	22	2nd	194 (69.29)	280	3rd

Figures in parentheses are percentages

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