

Acoustic Over-Exposure as Public Nuisance in the Institutional Land Use of Calabar Metropolitan Area, Cross River State, Nigeria

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ABSTRACT

Every tertiary institution is meant to be a centre of excellence in terms of academic activities as well as enabling environment to achieve such. However, a lot of these academic settings have turned to activity hubs of varying nature of landuses, which daily generate high acoustic levels. The study comparatively assessed noise level across the two major tertiary institutions in Calabar metropolis, Nigeria. The objectives were to identify institutional sources of noise, perform comparative analysis of noise levels across tertiary institutions in Calabar metropolis as well as render viable measures for reducing the incidence and effects of noise levels in tertiary institutions within Calabar metropolis. Sound level data was acquired using BK Precision 732 Digital Sound Level Meters. Analysis was done using the Analysis of variance (ANOVA) technique. From the test, 'F' value calculated (2.74) is greater than the 'F' tabulated (1.86) which implies that there is a significant variation in noise levels within the University of Calabar and the University of Cross River State. Observations show that generator noise, socio-economic activities, extra-curricular activities within tertiary institutions, traffic within and outside the school premises and business outlets within the study locations are the main sources of noise pollution within the institutions. It was therefore, recommended that University authorities should zone/allocate landuses to activities that are similar to each other so as to avoid land use conflicts and incompatibilities. Besides, land uses which are not compatible with the university environment should be eliminated. University authorities should help reduce the total number of generating sets within the school premises by allocating one generating set which will serve all business operations within the school premises and such should be away from lecture venues and other offices.

Keywords: Noise, Institutional Noise, Acoustics, Land Uses

1.0 Introduction

The major role of the tertiary institutions in Nigeria as defined in the National Policy on Education according to the Federal Ministry of Education (2019) includes the provision of high-level manpower for national development, and this role is achieved through its core mandates of teaching, learning and research. It is impossible for the roles of these tertiary institutions to be achieved without the presence of a tranquil university environment. According to Debnath, Nath and Barthakur (2012), noise pollution around the educational institutes of produces multi problems to the teaching-learning process and negatively affects the performance of both teachers and students. The extent to which university are able to perform their core functions will depend on a number of factors, which include a quiet learning environment.

According to Menkiti (1990); Ntui (2009); Bentley (2022); Obiefuna, Njar and Bisong (2021); Akhtar, et al (2021), Obiefuna, et al, (2021) Obiefuna, et al (2022); Obiefuna et al (2025); Eni, et al (2023), various land use elements and activities have been identified as the major sources and contributory factors in the degradation of ambience with respect to noise and general pollution. These noise sources according to Knights (2008) are part and parcel of the urban environment of which Calabar and its tertiary institutions are not exempted.

The environment of Nigerian universities has changed with, stringent economic conditions and rising enrolment that have resulted in over-crowding of few available facilities. Library users in Nigerian universities are highly inconvenienced by sounds of varying loudness. This is because the university communities in Nigeria are now subjected to noise from vehicles, motorcycles, buses, sirens, noise from hawkers, electric generators as well as noise from students and staff themselves. All these have given rise to a noisy educational environment, which makes working, leisure, learning, reading, studying and teaching difficult, and sometimes impossible. Attempts have, however, been made at the Federal level of Nigerian government to control noise in Nigeria.

2.0 The Problematic

Noise is an issue to be dealt with, constantly increasingly, prevailing and yet unnoticed form of pollution plaguing educational institutions in Calabar metropolis. The metropolis has increased from 99, 352 persons in 1963 to over 371, 022 persons in 2006 (N. P. C. 2007). The population increase apparently resulted to an increase in economic activities and proliferation of many religious houses within and outside the institutions, turning them to “noise factories”, creating several noise islands. Noise generation within these institutions has been recently seen to cause reading delays. A significant negative relationship has been found between noise levels and learning attainment, cognitive processing, and to a large extent, numeracy tasks.

Noise has also been found to negatively affect other performance-related aspects such as attention, concentration and memory. Irrelevant speech has been shown to have a profound detrimental effect on students’ literacy tasks. Noise sources within the study locations are transportation activities within learning locations, economic activities within school environment, generators, and photocopy stands. A school environment should be free from any form of noise pollution and also free from all form of noise or economic activities a serene environment is what a university environment should be made of and should be a premise of better concentration and learning but the study location fails to live up to expectation. Our knowledge of noise levels in Nigerian university hitherto is unknown. It is worrisome, when the level of noise in an acclaimed educational facility is not known. This leaves a gap of understanding in the levels of environmental noise in these centers of leaning and research.

3.0 Aim and objectives of the study

The main aim of this study is to examine comparatively analysis of noise levels across tertiary institutions in Calabar metropolis.

The objectives are as follows:

- To identify institutional sources of noise
- To perform comparative analysis of noise levels across tertiary institutions in Calabar metropolis.
- To recommend measures for reducing the effects of noise levels across tertiary institutions within Calabar metropolis.

4.0 The Study Hypothesis

Hypothesis for this study thus states:

H₀. There is no significant variation in noise levels across the two institutions (University of Cross River State and University of Calabar).

5.0 The study Area

5.1 Location

The University of Calabar and University of Cross River State lies within ($6^{\circ}20''$ - $6^{\circ}40''$ N; $8^{\circ}4''$ - $9^{\circ}0''$ E) which are located in Calabar municipality and Calabar south local government area (FIG 1.). The 17-hectare site on the eastern side of the city of Calabar between the Great Qua River and the Calabar River. Additional land has been acquired on both sides of the Great Qua River for the development of the University.

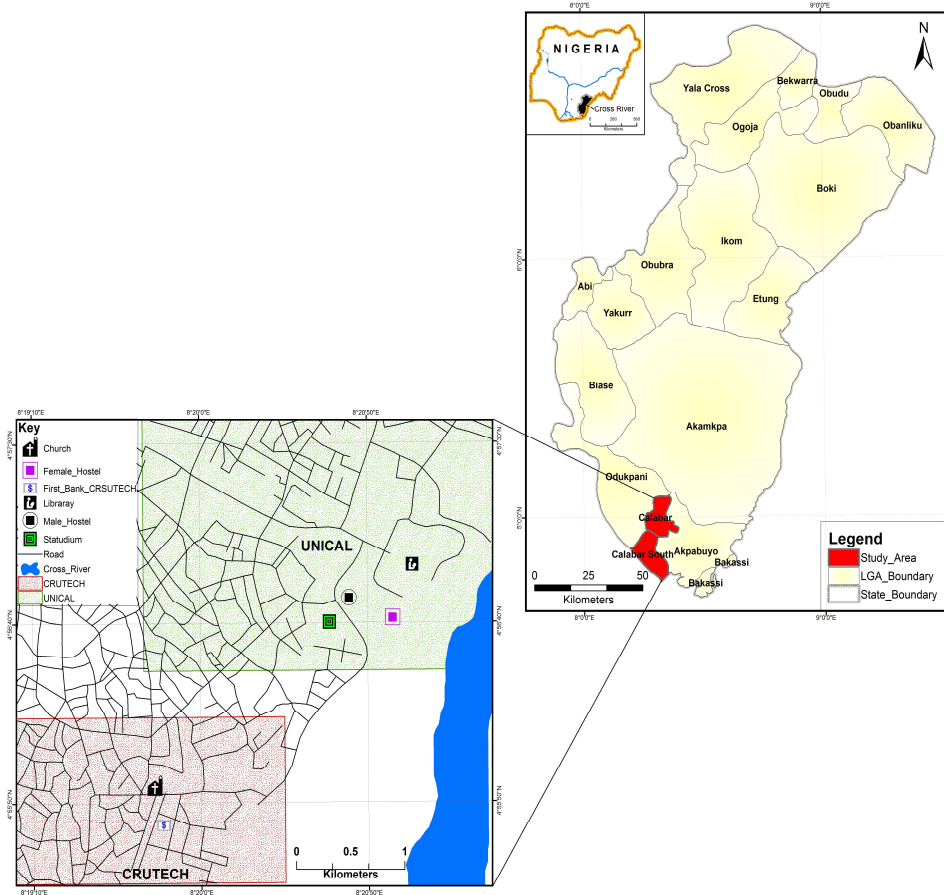


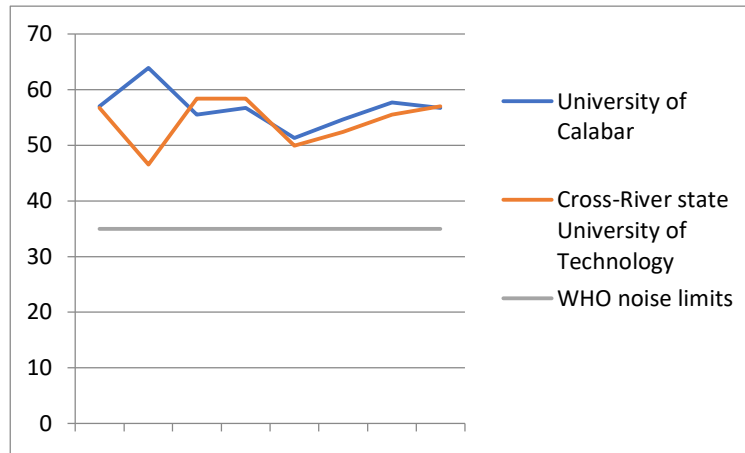
Figure 1: Cross River State map showing University of Calabar (Unical) and The University of Cross River State (UNICROSS)
 Source: Authors, 2023

6.0 Instrumentation and Analytical Techniques

The experimental apparatus used in the recording of noise levels consisted of a BK Precision 732 Digital Sound Level Meters. It is equipped with 4 digits Liquid Crystal Display (LCD), a condenser microphone and an octave filter. During measurements, the microphone was positioned in such a way as not to be in acoustic shadow of any obstacle in the field of the reflected waves. It has a resolution of 0.1 dB and an update cycle 0.5 second. The system provides 30 to 130dB capability in three convenient measurement ranges. The ranges are Low (30 to 80dB), Medium (50 to 100dB) and High (80 to 130dB), with an accuracy of ± 1.5 dB. The meter meets the International Electrotechnical Commission (IEC) 651 Type II standard, and includes frequency weighting of A and C and fast and slow time weighting. The A-

weighting was used because of its recommendation for environmental and industrial studies (Peterson and Gross (1974). Analysis was done using the analysis of variance (ANOVA) statistics.

7. Results



Source: Authors, 2023

Fig.2 Comparative Assessment of noise levels within the University of Calabar and University of Cross River State.

Fig.2. Shows graphical representation of different Noise levels within, the two (2) tertiary institutions (University of Calabar and University of Cross River State. The data presentation shows that, noise levels are relatively high within the University of Calabar than University of Cross River State. Both of the institution exceeds WHO noise level limits thus, resulting to increased noise levels which is above that of WHO recommendations. This is because of increased socio-economic and educational activities within the University of Calabar environment than that of UNICROSS.

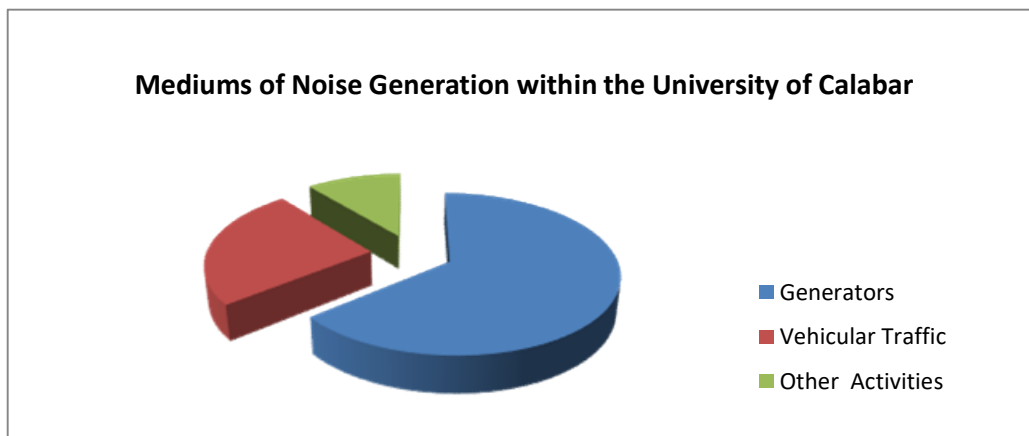


Fig.3 Mediums of Noise generation within the University of Calabar.

Source: Authors, 2023

This presentation shows that Electricity Generating sets operated by business centers within the school premises and vehicular Traffic within and out of the school premises are the mediums with the highest level of Occurrences than that of other activities are relatively at a medium scale.

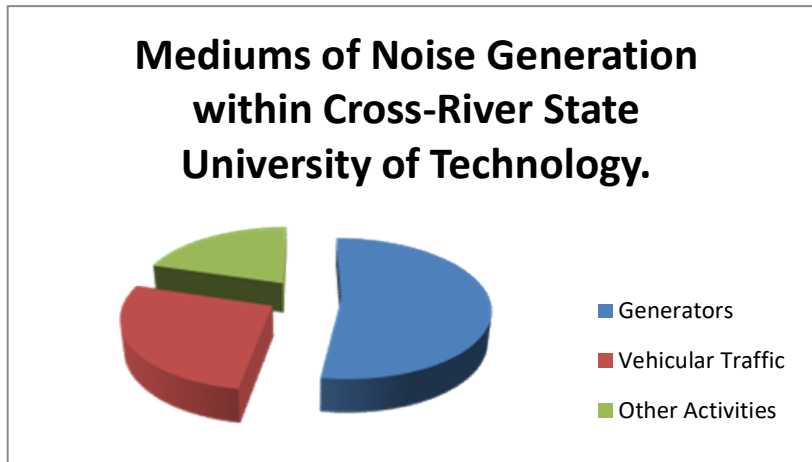


Fig.4 Shows Mediums of Noise Generation within the University of Cross River State
Source: Authors, 2023

The presentation shows that Generating sets operated by business centers within the school premises and vehicular Traffic within and out of the school premises are the mediums with the highest level of Occurrences than that of other activities are relatively low.

7.0 Discussion of findings

The findings shows that generator noise, socio-economic activities, extra-curricular activities within tertiary institutions, traffic within and outside the school premises and business outlets within and outside the study locations are the main sources of noise pollution within the study location These can be observed by going through various analyzed noise levels within the tertiary institutions, during the course of the study. Analyzed noise levels shows that noise levels within the two study locations are as a result of human activities within and out of the study locations. Upon the sources of noise generation within the study location the apparent consequences includes. In order to proffer solution to the problem of noise generation within the study location, arrays of suggestions were put forward by the researcher so as to curb the challenges of noise generation within the study locations.

Analysis was done using the Analysis of variance (ANOVA) technique. From the test, 'F' value calculated (2.74) is greater than the 'F' tabulated (1.86) which implies that there is a significant variation in noise levels within the University of Calabar and the University of Cross River State. Observations show that generator noise, socio-economic activities, extra-curricular activities within tertiary institutions, traffic within and outside the school premises and business outlets within the study locations are the main sources of noise pollution within the institutions.

8.0. Summary

The study aimed at comparatively analyzing noise levels within the university of Calabar and the University of Cross River State. The first chapter of the study is concerned with the introduction and identification of noise and the different levels of noise and also, problems of the study locations as well as the objectives of the study.

The study hypothesis was also stated and its significance tested. Several information in literatures were logically reviewed in the second chapter with acknowledgement of different authors. In the third chapter, the method of the study data collection and analysis were

explained while data presentation and analysis procedures were carried out in the fourth chapter.

Nevertheless, with the appropriate and systematic approach adopted in the study, the findings from the field shows that virtually the entire study area was affected by noise in one way or the other as the average noise levels within the two study locations was not in accordance with WHO permissible noise levels for an academic environment.

9.0. Recommendations

Sequel upon the study objectives the following recommendations are therefore put forward so as to help ameliorate the observed challenges of increased noise levels within the study locations:

- University authorities should zone/allocate landuses to activities that are similar to each other so as to avoid land use activity conflicts and incompatibilities. In addition, land uses which are not compatible with the university environment should be eliminated.
- Electricity supply within the university environment should be constant in order to reduce the use of generating sets used in business centers within the school environment.
- University authorities should help reduce the total number of generating sets within the school premises by allocating one generating set which will serve all business operations within the school premises and such should be away from lecture venues and other offices.

10. Conclusion

The study comparative analysis of noise levels in the universities within Calabar metropolis. Findings show that, noise levels occasioned by various economic activities are relatively high in the University of Calabar than University of Cross River State. However, the universities must be purged of every intolerant noise producing activity. This leads to the conclusion that increased socio-economic and educational activities within the University of Calabar environment have led to increased noise levels. This occurrence leaves the ordinary Student stranded and also, reducing the educational standard of learning within tertiary institutions of the study location.



Plate 1: Generators as a major source of noise

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