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### Incidences of Noise Pollution in Selected University Libraries in North Central Nigeria

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#### Abstract

Five libraries of the Joseph Sawuan Tarka University, Makurdi, Benue State University Makurdi, Federal University Lafia, University of Ilorin, and Kogi State University were randomly selected, visited, with the intent to determine the incidences of noise pollution, their sources and their ratings based on a comparative analysis. Combined with other methods such as on-site observation, identification of factors causing noise and the noise level in each library was measured using a digital sound level meter (model JTS-1357). Each library was demarcated into three; the lobby, general and referral sections. The basal noise level was measured for each library at 7.30- 7.45am, the second reading between 12-1pm and the evening measurement at 4-5pm. The data generated was analysed, tabulated and bar charts drawn using SPSS version 17.

Results obtained show that University of Ilorin had the highest basal noise of 49.5dbA, while Federal University Lafia had the list of 37.9dbA. When the mean noise was computed University of Ilorin came top with 56.03dbA as the noisiest of all University libraries visited, while Kogi State University had the list noise level 48.37dB and a sitting capacity of 700 students. All these are far above the specified noise limit for libraries as specified by audiologists and World Health Organisation WHO, (1999) [12]. It is recommended that a strict law concerning noise pollution should be developed and enforced for not only universities but, all libraries. Those that have been built already may have the alternative measures put in place to reduce the effect of noise.

**Keywords:** Basal, Dosimeter, Library, North Central Nigeria

#### 1. Introduction

Noise though an unavoidable part of our daily lives, has increasingly become burden on the quality of lives. The word noise is concisely defined as unwanted sound that creates annoyance and interferes with conversation, disturbs sleep and teaching-learning process, reduce work efficiency, causing stress and challenge to public health Debnath *et al.* (2012) [4]. University libraries are expected to provide noise-free environment in order to enhance reading and learning. Noise in the library can be very distractive and inimical to the purpose of the library. Silence which is the absence of noise is thus a singular criterial that must be in place to facilitate the conducive environment they will enhance learning. A conducive environment for a library is that noise level is controlled and other factors such as lighting, space, furniture and good ventilation are adequately provided to enhance learning. Various studies have concentrated on identifying the low-level use of university libraries in Nigeria. However little attention has been given to the library conditions and the effect of noise as a factor to student's use of the university library in Nigeria. Furthermore, in an academic environment a noise-free atmosphere is adequate for any serious academic work. This was why Shane, (2007) [9] stressed that the best sound for study is silence, especially when one needs to concentrate, but if conversation must take place this has to be in a low tone in recognition of the need for silence by other readers Arizona Board of Regents, (2007) [2]. Berglund *et al.* in WHO (1999) [12] maintained that to be able to hear and understand spoken messages in the classrooms, the background sound level should not exceed 35dB(A) LAeq. During teaching sessions. For outdoor playgrounds, the sound level of noise from external sources should not exceed 55dB(A) LAeq., the same value given for outdoors residential areas in daytime by WHO.

Noise pollution reduced learning capabilities Woolner and Hall, (2010) [11]. Environmental noise may affect sleep, conversation, academic work in terms of reading, learning, and causes annoyance thus affecting task performance. Obot and Ibanga, (2013) investigated noise pollution and found that, the pollution level in the University of Uyo is high and reaches a peak of 89.5dB(A) during the hours of 11am - 12noon. The noise emission level within the University has exceeded the maximum allowable noise level which ranges between 40dB(A) to 50dB(A) recommended for educational institutions NIOSH,

(1998) and could produce noise-pollution problems leading to annoyance, lack of concentration, interfering with communication and causing general stress, low productivity and increasing work absenteeism. Debnath *et al.*, (2012) <sup>[4]</sup> pointed out that environmental noise pollution in educational institutes produces multi-problems to teaching-learning process and negatively affects the performance of both teachers and 21 students. Alsubaie, (2014) <sup>[1]</sup> found out that the indoor noise levels were significantly high since it exceeded the WHO (2011) <sup>[10]</sup> guideline (35dBA).

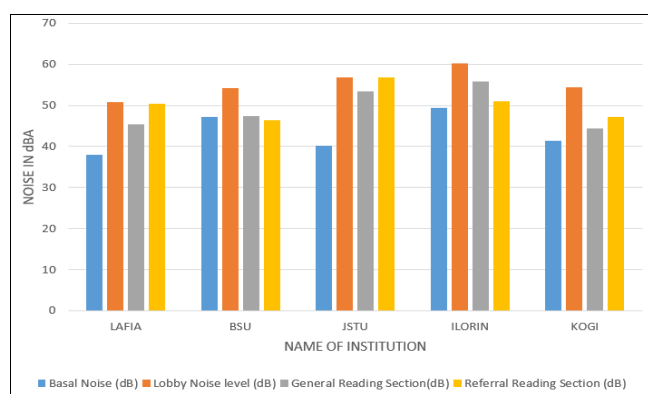
Library noise is occasion from loud discussions, loud footsteps, door bangs or sometimes imbedded in the structural designers of the facility. Another noise sources are road transport, pedestrian and background or ambient noise. It can also come from closely location of equipment, industrial type generators or engines. It is pertinent for architects and engineers to anticipate these potential noise sources within and without the library and control same from the arrangement of the building.

The paper seeks to reawaken the consciousness of policy makers to this silently growing menace, and to solicit the corrective efforts in places where harm has been done.

## 2. Materials and method

225 measurements were done in Five libraries of Joseph Sawuan Tarka University, Makurdi., Benue State University Makurdi, Federal University Lafia, University of Ilorin, and Kogi State University were randomly selected, visited, with the intent to determine the incidences of noise pollution, their sources and their ratings based on a comparative analysis. Combined with other methods such as on-site observation, identification of factors causing noise. Each library was divided into three parts namely; lobby, general and referral sections. The noise level within each library was measured 45 times in five days using a digital sound level meter (model JTS-1357), on-site observation and identification of factors causing noise were also done. The basal noise level measurement was taken in the morning 7.30 -8.00 am before readers was allowed into the library and before appliance switched on. The second readings were measured at 12.30 -1.00 pm while the third readings were taken between 4.30 – 5.00pm. The data generated was analysed using SPSS version 17. Measurements were taken approximately one meter away, with the microphone approximately 1.2 meters above floor level and varying values displayed in form of graphs obtained.

## 3. Results and discussion



**Fig 1:** Comparative bar chart of Basal, Lobby, General and Referral sections of the University Libraries

## Comparison Between the Basal Noise Levels of all Universities Visited

Fig 1 shows that five Universities that were randomly selected for the purpose of this study. The blue bar represents the basal noise, orange lobby noise, ash noise in the general reading section, and yellow the noise level in the referral section.

Analysing the blue bar shows that University of Ilorin has the highest basal noise level of 49.5dB followed by Benue State University 47.25dbA, Kogi State University with 41.38dBA, *Joseph Sawuan Tarka University, Makurdi* had 40.16DbA, and Federal University Lafia had the lowest basal noise level 37.9dBA.

From these it is clear that all the universities except Federal University Lafia are above 40dB which is the recommended noise level for libraries as specified World Health Organization WHO, (1999) <sup>[12]</sup>. From the physical observation, the University of Ilorin library is poorly located followed by Benue State University and then Kogi State University.

## Lobby Noise Levels

The lobby noise level measurements clearly University of Ilorin leads with 60.3dB, followed by *Joseph Sawuan Tarka University, Makurdi* with 57.1dB, Kogi State University with 54.4dB, Benue State University with 53.7dB and Federal University Lafia with 50.9dB are all above 40dB which is the recommended noise level of a quiet library as specified audiologist and World Health Organization WHO, (1999) <sup>[12]</sup>.

## General Section Noise Levels

The noise level measurement obtained in the general reading section, University of Ilorin led with 56.9dB *Joseph Sawuan Tarka University, Makurdi* 53.5dB, Benue State University had 47.3dB, followed by Federal University Lafia with 45.4dB and Kogi State University was the least 43.6dB are all above 40dB recommended noise level for libraries as specified by World Health Organization, (1999) <sup>[12]</sup>.

The physical inspection process identified that the noise in the general section of the university libraries visited could be attributed to the internal controllable sources such as phone ringing footsteps, discussions, door bangs, interactive study, noise from faulty fans, moving of chairs and tables.

## Referral Section Noise Levels

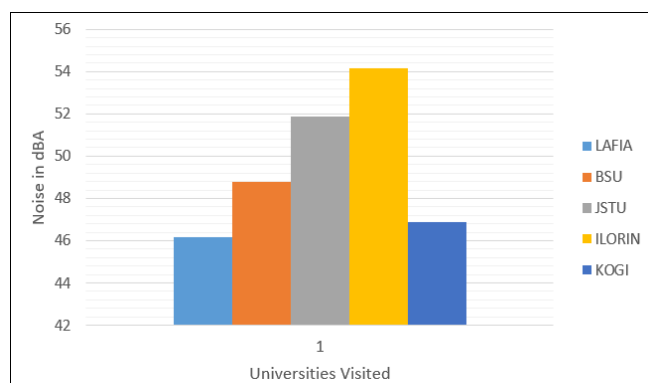
From measurement in the referral reading sections, *Joseph Sawuan Tarka University, Makurdi* had the highest noise level of 53.7dB, followed by University of Ilorin with 50.9dB, Federal University Lafia with 50.3dB, Kogi State University with 47.1dB and Benue State University (BSU) with 46.4Db.

All the five University libraries recorded noise above the recommended noise level for library as specified by audiologist and World Health Organization WHO, (1999) <sup>[12]</sup>. The noise in the referral section of the university libraries visited is generated from internal sources such as phone ringing, footsteps, discussions, door bangs, interactive study, noise from faulty fans, moving of chairs and tables.

## Comparing the Aggregated Noise Levels of all University Libraries Visited

Fig 2 shows the mean of the noise level in each library;

University of Ilorin with 54.175dB is the noisiest of all University libraries visited, this can be attributed to the fact that it is the largest of all the University libraries visited with a sitting capacity of 1200 students, while *Joseph Savuan Tarka University, Makurdi* with a noise level of 51.849 dB has a sitting capacity of 1000 students, Benue State University (BSU) with a noise level of 48.774 dB has a sitting capacity of 1000 students, Federal University Lafia with a noise level of 46.161dB has a sitting capacity of 500 students. The University with the lowest noise level is Kogi State University (KSU) with a noise level reading 46.856 dB and a sitting capacity of 700 students.



**Fig 2:** Aggregated Noise Levels of University Libraries

#### 4. Recommendations

Given the importance of library spaces for students and the diverse needs of user populations, noise is likely to continue to be an issue for academic libraries. The following are recommended to help improve the noise levels in library space

1. Ensure strict compliance to laws on the design, siting and development of libraries as it concerning noise pollution.
2. Increase awareness, reminders on the for “silence” among library users and library staff, on noise and its adverse effect on health, reading and learning process.
3. Trees and vegetation should be planted around the library building. It is known that trees and vegetation can absorb 4dB-6dB noise intensity depending on their characteristics.
4. A sound insulated room should be built in the library to accommodate those who need to carry out group study or research.
5. Speed limit should be applied to vehicles driving in any road near the library.
6. Noise absorbing materials such as rugs should be used as floor finishes in library buildings.

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