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# Noise Sources and Levels at the University of Calabar Library, Calabar, Nigeria

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## Abstract

*The purpose of this study was to determine levels of environmental noise and identify noise sources that inconvenience library users in the University of Calabar Library. Data were collected using a Sound Level Meter to take acoustical measurements at over 100 points in and around the library, whilst a survey questionnaire was used to elicit information from users of the library. The survey sample consisted of 980 library users drawn from all the reading rooms in the university library. The study found that levels of noise in the university library were high [43.5 – 88.5 dB(A)] and exceeded the acceptable level of noise set by World Health Organization (WHO). The major sources of noise in decreasing order were noise from people, automobiles, aircrafts, cellular phones and equipment. The implication of this finding is that noise poses a serious threat and distraction to library users, as they cannot concentrate during reading and study activities in the library. Another implication of the finding is that the management of the university library appears not to be managing the problem of noise effectively. The study proffers several recommendations which, if implemented, would reduce significantly noise levels in the library considerably and make them conform to World Health Organization [WHO] standards.*

## Keywords

Noise, environment pollution, university libraries, library user, Nigeria

## Introduction

Environmental noise is any unwanted sound that constitutes a menace to the environment. It is sound at the wrong time and in the wrong place. Environmental noise is as a result of human attitude, and is increasing with industrialization and urbanization. Noise can cause an emotional strain and become a source of great frustration when the noise is beyond a person's control. Noise causes exhaustion, absent-mindedness, tenseness and irritability (Wright, 2002). Universities are important agents in the development of human resources of any nation. The major role of the universities in Nigeria as defined in the National Policy on Education (Federal Ministry of Education, 2000) includes the provision of high-level manpower for national development, and this role is achieved through its programmes of teaching, learning and research. These roles of the universities cannot be achieved without the presence of a vibrant university library (Aguolu, 2003). University libraries assist the universities in the discharge of their functions by acquiring all the relevant information resources necessary for sustaining the teaching, learning, research and the public service functions of their universities. The extent to which university libraries are able to perform these functions will depend on a number of factors, which include a quiet learning environment.

The environment of Nigerian universities has changed with stringent economic conditions and rising enrolment that have resulted in over-crowding

of few available facilities. Daily, many library users in Nigerian universities are battered by sounds of varying intensities. This is because the university communities in Nigeria are now subjected to noise of cars, motorcycles, buses, sirens, the roars of airplanes, noise from hawkers, the noises of electric generators, student and staff themselves. All these have given rise to a noisy 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. On Monday, April 26, 1982, the House of Representatives Committee on Housing and Environment in a bold step towards the control and abatement of environmental noise in Nigeria called for memoranda on "Noise Pollution and Urban Noise Control Measures". More recently, in 2001, the Nigerian Senate began debate on the bill to ban the use of siren because of high noise levels (Onuu, 2000). This has recently led to the submission of a proposal of training for minimization of road traffic noise by Federal Road Safety Corps. Unfortunately, these attempts to reduce noise by the Nigerian government are not pursued to their logical conclusion, as noise has continued to be a major source of nuisance to the university communities in Nigeria. Our knowledge of noise levels in Nigerian university libraries hitherto is unknown. This leaves a gap of understanding the levels of environmental noise in university libraries in Nigeria. The study was therefore conducted to fill this knowledge gap by providing answers to the questions: What are the levels of environmental noises and what are the sources of noise that disturb library users in the University of Calabar library?

## Literature Review

Noise is not a new phenomenon, but rather it is a problem that has grown steadily worse with time (Yano, Yamashita & Izumi, 1991). The poet, Decimus Junius, commented on conditions in ancient Rome and stated that noise caused more death among the Roman invalids than any other factor. Today, environmental noise poses a multi-dimensional urban challenge, and noise is the most widespread nuisance (Onuu, 2000). Noise in a library is part of the nature of the environment, and the university library is a dynamic university community centre that offers a wide range of services and materials. Noise in library has become a huge distraction for those who see the library as their sanctuary for quiet study and review of resources (Crumpton, 2007).

Studies have been carried out on noise levels in libraries. In autumn term of 2002, the Aberdeen University Library Services Division carried out a noise survey in the library. The survey concentrated on two forms of noise – people conversation and mobile phones and permissible levels of noise. The findings indicated that noise levels were high in the library (Aberdeen University, 2002). Hanna (2002) in a study of environmental appraisal of historic buildings in Scotland: the case study of the Glasgow School of Art reported that preliminary recordings of sound level showed an evidence of noise nuisance in one of the GSA offices.

In late March to early April 2003, the Robert Gordon University (RGU), United Kingdom, undertook a web-based survey to measure users' perception of the library service. The findings showed that noise in the library was a great nuisance. Dominy (2004) conducted a survey in Hagerty library in Drexel University and observed that noise levels are high in the library, especially at the circulation desks. In Appalachian School of Law, Grundy, United States of America, a biennial library survey was conducted during March and April, 2004. The results of survey showed that noise levels in the school were high and the library environment was not conducive for reading and learning (ASL, 2004). In spring 2005, a user satisfaction survey was conducted in the Aston University Library in the heart of Birmingham, most of the students commented that the library was too noisy for quiet study. In 2004, the eleventh annual general satisfaction survey was conducted in the Glasgow Caledonian University Library (2004). The findings showed that noise from people in library environments makes the respondents not very satisfied.

However, very few studies regarding noise in university libraries have been carried out in Nigeria. Ozowa (1996) studied on architectural design that reduces noise in Nigerian library buildings; and in the study, no inclusion of noise levels or sources were mentioned. Exhaustive search of the literature showed that no known study has been conducted on

any Nigerian university library to determine noise levels, given the relatively old age of the library buildings and changing use of and study techniques since the buildings were designed.

**University of Calabar Library**

The University of Calabar (UNICAL), located in Calabar; Cross River State, Nigeria was established on 1st October 1973. It grew out of the Calabar campus of the University of Nigeria, Nsukka (UNN). Today, the University of Calabar (UNICAL) library houses about one million unique collections, which support the university's academic curricula, as well as research and scholarship.

The library moved to its present building in 1987. The new library building is located at the centre of the new academic campus with faculties of Medicine, Science, Arts grouped around it within a five-minute walking radius. The building, excluding the basement, is a four-storey "H" shaped structure with each wing measuring 108 by 14.775 metres. The wings are linked in the middle on each floor by a central service court 18 metres long. It is also linked at each end of each floor by a covered walkway. The central service court carries the main staircase and landings, lift (not functional) and conveniences on all the floors.

The right wing faces the science faculty, which is towards the North of the university campus, and it is separated from the science faculty by a car park. The first floor of the right wing houses the reference and social science libraries. The second floor houses the science, technology, medical and law reference library. The third floor houses the research library division (which consists of journals, abstracts and indexes) and the Africana division.

The left wing faces the Great Kwa River on the east of the campus. The ground floor houses the resource development, processing and humanities units. The first floor of this wing houses the university librarian's office, ICT portals, classrooms and some business centres. Eighty-nine (89%) of the second floor is used for classrooms and business centres. Department of Radiology uses the third floor as offices and classrooms. The fourth floor of the building is not completed. There are adequate numbers of electric fans, which facilitate air circulation inside the library; however there is no air conditioning.

To the west of the university is the Calabar International Airport. The University of Calabar library has ICT infrastructural facilities supporting a virtual library network equipped with sixteen computer systems. The opening hours of the library are Mondays to Saturdays between 8am and 10pm during sessions, and between 8am and 6pm during vacation.

**Table 1: Layout of the University of Calabar Library Building**

## Research Methods and Instruments

This survey used three main methods to collect data: a combined acoustical (using sound level meter), a questionnaire and direct observation methods. The use of combined methods is because noise has sensory, spatial and behavioural aspects in terms of their sources, magnitudes and effects. Similar methods were used in other noise monitoring programmes in Japan (Yono, Yamashita & Izumi, 1991), in the United States of America (Reuters, 2002), and in India (Pal & Samantha, (2002). These methods are in conformity with the American National Standards Institute [ANSI] (2002) recommendations for the description and measurement of environmental noise.

### Sound Level Meter

Sound is measured in decibels (dB). The decibel reading has been adapted to match the way that the human ear works (National Institute on Deafness & other Communication Disorder, 2004). One decibel is approximately equal to the threshold of a person's hearing. The human ear is not equally sensitive to sound at all frequencies. A special frequency dependent rating scale has been devised to relate noise to human sensitivity. It is called the 'A' weighted decibel scale [dB (A)] and performs this compensation by discrimination against frequencies in a manner approximating the sensitivity of the human ear (Kryter, 1996).

A sound level meter is an instrument, which gives objective, reproducible sound level in decibels (db), and is for monitoring sound levels in a 30dB to 130dB range. The sensing microphone on the sound level meter is located at the end of the silver barrel at the top of the meter. The front panel has an LCD and four buttons labeled POWER, WEIGHTING, DB, and REPONSE. LCD display allows for easy use and viewing of measuring sound levels. A 3.5-mm signal output terminal is located on the bottom of the meter. The output of this terminal is sent to the data logging end. Panel buttons turns the meter power on and off. It also controls the output of the signal output terminal. When the switch is in the "ON" (DC) position, the output is a DC signal which is proportional to the dB level. When the switch is in the "ON" (AC) position, the output is the AC signal from the sound level meter. This switch sets the range for the panel read out. In low noise settings, the switch is set on the "30 – 80" scale. If a small solid triangle appears to the left of the digital readout, other settings for higher sound levels are used. In this study, the B & K Type 2203 precision sound level meter was used. The meter was set up on a tripod 1.2m above the ground. This level corresponds to the ear level of an average human height (Yono, Yamashita & Izumi, 1991).

The library was zoned into four sites. Measurements of noise levels were made at the outside and inside (with windows open) of the university library building. Measurements were made in the university library at noisy and quiet periods during the day (8am - 6pm) and during the night (7pm -10 pm) on working days (Mondays to Saturdays). All measurements were made without any specific noise source in mind. One hundred random readings were taken at different locations in and outside the university library.

### Questionnaire

The choice of the questionnaire as the appropriate instrument for the study is based on objective oriented rating in measuring community response to noise level. Aberdeen University library services (2002) used a questionnaire with rewarding success during a noise survey of their university libraries. The questionnaire used in this study had eight items and was pre-tested. The first part of the questionnaire requested from respondents such personal information as age, gender, length of time as staff or student, and hearing status. The questionnaire also asked if the respondent had any hearing problems. The second part elicited data on the sources of noise, level of disruption of activities, and the respondent's rating of the level of noise. The questionnaire was handed out to everyone entering the reading rooms of UNICAL library on a half hourly basis for one week. The researcher assumed that everyone allowed access to the library was a regular, registered and bona fide library user. The questionnaire had accompanying text explaining the rationale for the survey. This study was undertaken in February, 2008.

Out of the one thousand and forty six (1,046) copies of questionnaire distributed, nine hundred and eighty - eight (94.45%) were returned with valid

responses. Thirty-one copies (2.87%) were not returned at all and 27 copies (2.68%) were returned uncompleted. From the 988 respondents, three (3) respondents who had hearing problems and were not using hearing aids were excluded from the study. Also, five (5) respondents that indicated that they had other worries besides noise and could not concentrate while in the library were excluded. Nine hundred and eighty (980) respondents were actually used for the study, and their demographic attributes are summarised in Table 2.

**Table 2: Background Information of Respondents**

| **Age (years)** | No. | % | **Gender** | No. | % | **Length of stay (years)** | No. | % | **Hearing status** | No. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *17- 27* | 539 | 55.0 | *Male* | 674 | 68.8 | *1-2* | 184 | 18.8 | *Using hearing aid* | 10 | 1.0 |
| *28-37* | 263 | 26.8 | *Female* | 306 | 31.2 | *3 or more* | 796 | 81.2 | *Not using hearing aid* | 970 | 98.9 |
| *38 and above* | 178 | 18.2 | | | | | | | | | |
| **Totals** | **980** | | | **980** | | | **980** | | | **980** | |

No. - Number of respondents
Source: Field Data (2008)

**Table 3: Average Outdoor - Indoor Noise Levels**

| Zone | UNICAL Library Location | Night periods dB(A) | | Day periods dB(A) | |
|---|---|---|---|---|---|
| | | *Indoors* | *Outdoors* | *Indoors* | *Outdoors* |
| 1. | Front | 44.0 | 46.0 | 74.2 | 88.5 |
| 2 | Back | 44.0 | 44.0 | 64.5 | 68.0 |
| 3 | Right | 43.5 | 43.7 | 65.0 | 67.0 |
| 4 | Left | 43.5 | 43.9 | 68.0 | 75.0 |

Source: Field Data (2008)

## Findings

### Measurements with the Sound Level Meter

Table 3 shows the average indoor and outdoor noise levels, at various locations in the university library. For night periods, the noise levels were 43.5 and 46.0 dB(A), while 64.5 and 88.5 dB(A) were measured for day periods respectively. The results revealed that level of environmental noise is high in University of Calabar library.

### Respondents' Rating of Noise Levels

Respondents were asked to rate the noise levels in the UNICAL library. The results revealed that 348 (35.5%) respondents rated the university library as noisy, 377 (38.47%) rated the library as very noisy; while 144 (14.70%) rated the library as extremely noisy (Table 4)

**Table 4: Respondents' Rating of Noise in the Library**

| **Noise rating** | **Total** | **(%)** |
|---|---|---|
| Extremely quiet | 0 | 0.0 |
| Quiet | 111 | 11.32 |
| Noisy | 348 | 35.51 |
| Very noisy | 377 | 38.47 |
| Extremely noisy | 144 | 14.70 |
| Total | 980 | 100 |

Source: Field Data (2008)

**Major Sources of Noise in the Library**

On noise heard most often by respondents, Table 5 shows that 'people' was indicated by close to half (44.80%) of the respondents, followed distantly by automobiles (21.53%), and yet more distantly by air planes (14.79%), and then cell phones (10.31%) and equipment (8.57%). Figure 1 charts the relative frequencies with which the different sources of noise were mentioned by the respondents.

**Table 5: Major Sources of Noise in the Library**

| Source of noise | Frequency | % |
|---|---|---|
| Automobiles | 211 | 21.53 |
| Cell phone | 101 | 10.31 |
| Air planes | 145 | 14.79 |
| Equipment | 84 | 8.57 |
| People | 439 | 44.80 |
| Total | 980 | 100 |

Source: Field Data (2008)

**Effects of the Noise on Different Categories of Library Users**

Table 6 summarizes the respondents' estimation of the disruptive effects of noise on activities in the library. Disruption of activities by noise was rated by respondents to be "slightly', "much" and "very much" by 30.1%, 38.6% and 31.3% of the 980 respondents respectively.

**Table 6: Respondent's Rating of the Level of Disruption of Activities Caused by Noise in the Library**

| Very Much | Much | Slightly | Not at all | Total |
|---|---|---|---|---|
| 307 (31.3%) | 378 (38.6%) | 295 (30.1%) | 0 (0.0%) | 980 100% |

**Age and Perception of Level of Disruption caused by Noise**

Table 7 also shows data in respect of the column of perceptions by respondents in different age groups of the extent to which their activities are disrupted by the noise in the library. To find out if the level of disruption is influenced by age, a chi square test was used to analyse the data (Table 4). The calculated $\div^2$ value of 189.60 was greater than the critical $\div^2$ value of 9.49 at degrees of freedom (df) of 4 and 0.05 alpha level. Thus, age of respondent was found to be significantly associated with perceptions of the extent to which activities in the library are disrupted by noise. Comparison of the observed and expected cell counts in the table shows that very young users (aged 17-27 years) appeared less disrupted by the noise, whilst those aged 27-37 years tended to be 'much' or 'slightly' disrupted, but not 'very much'. Finally, older respondents (aged 39 years or above) tended to be 'very much' disrupted by the noise than their younger counterparts.

**Table 7: Respondents' Perception of the Extent Of Disruption of Activities Caused by Noise**

| | Extent of disruption caused by noise | | | |
|---|---|---|---|---|
| *Age (Years)* | ***Very much*** | ***Much*** | ***Slightly*** | ***Total*** |
| 17- 27 | 158 (168.85) | 205 (207.90) | 176 (I62.25) | 539 |
| 28-37 | 25 (82.39) | 128 (101.44) | 110 (79.17) | 263 |
| 38 & above | 124 (55.76) | 45 (68.66) | 9 (53.58) | 178 |
| Total | 307 | 378 | 295 | 980 |

NOTE: Expected values are in brackets.*Chi-square test results:*Calculated $\div^2$ = 189.60; Degrees of freedom = 4; Critical $\div^2$ = 9.49; Test is significant at 5% level.

**Gender and Perception of Level of Disruption caused by Noise**

A chi-squared test was performed to find out if there were gender differences in the respondents' perception and estimation of the extent of disruption of activities due to noise. The test showed that the calculated $\div^2$ value of 0.37 was less than the critical $\div^2$ value of 5.99 for two degree of freedom at the 5% level of significance (Table 8). The conclusion, therefore, was that male and female respondents did not differ significantly on their estimation of the extent of disruption caused by noise in the library.

**Table 8: Chi-squared Test of Gender Differences in Perceptions of the Disruptive Effects of the Noise**

| | Extent of disruption caused by noise | | | |
|---|---|---|---|---|
| *Age (Years)* | **Very much** | **Much** | **Slightly** | **Total** |
| Male | 215 (211.14) | 259 (259.97) | 200 (202.89) | 674 |
| Female | 92 (95.86) | 119 (118.03) | 95 (92.11) | 306 |
| Total | 307 | 378 | 295 | 980 |

NOTE: Expected values are in brackets.*Chi-square test results:*Calculated $\div^2 = 0.37$; Degrees of freedom = 2; Critical $\div^2 = 5.99$; Test is not significant at 5% level.

**Length of Stay and Perception of Level of Disruption caused by Noise**

Table 9 shows the distribution of respondents by the duration of stay at the university. The data show that most (81.2%) of the respondents had spent three years or more in the university, and so would have spent significant time in the library over the period. A chi square test with the data was undertaken in order to determine if respondents' estimation of the disruptive effects of the noise varied by length of their stay at the university (Table 8). The calculated $\div^2$ value of 118.56 was greater than the critical $\div^2$ value of 5.99 at two degrees of freedom and 5% level of significance. The conclusion, therefore, was that there was significant association between respondents' length of stay and their estimation of the disruptive effects of the noise. Comparison of the observed and expected cell counts in the table shows that respondents who had stayed in the university for a shorter period (1-2 years), as one would expect, felt disrupted by the noise more than those who had spent longer periods (3 or more years). The respondents who had spent longer periods had probably adapted to the noise, despite the likely undesirable health effects of the noise on them, such as gradual hearing noise and stress.

**Table 9: Chi-squared Test of Length of Stay Differences inPerceptions of the Disruptive Effects of the Noise**

| | Extent of disruption caused by noise | | | |
|---|---|---|---|---|
| *Age (Years)* | **Very Much** | **Much** | **Slightly** | **Total** |
| 1-2 years | 115 (57.64) | 59 (70.97) | 10 (55.39) | 184 |
| 3 or more Years | 192 (249.36) | 319 (307.03) | 285 (239.61) | 796 |
| Total | 307 | 378 | 295 | 980 |

NOTE: Expected values are in brackets.*Chi-square test results:*Calculated $\div^2 = 118.56$; Degrees of freedom = 2; Critical $\div^2 = 5.99$; Test is significant at 5% level.

## Discussion

The WHO standards indicate that noise levels inside educational institutions and schools should not exceed 45 dB(A). The noise levels recorded at the library were within the standards during night-time, but ranged between 64.5 and 88.0 at various points in the library during the day-time when most users patronise the library. The day time noise levels are much above the acceptable noise level standards. Thus, one can conclude that users of the UNICAL library are being inconvenienced and disturbed by noise. According to the United States Environmental Protection Agency (ASHA, 1995), at noise levels of 70 dB(A) or higher, only 45% of reading intelligibility is possible. This finding is similar to the investigations of Crandell, Smaldino and Flexer (1995) who revealed that high levels of noise in school environment contribute to poor reading skills of students. Similarly, laboratory studies by Bronzaft (1997) showed that people exposed to high levels of noise were not able to perform tasks requiring skills of attention such as reading. ANSI (2002) reported that when noises in schools exceed recommended levels, it is difficult for people to learn or study. The conclusion from the recorded day-time noise levels at the library is, therefore, that learning activities in the library are being compromised.

The high noise levels in the UNICAL library could be due to high population in the university. At inception, the university had only three faculties, 154 students and small complement of academic, administrative and technical staff. At present, the student population had increased to about twenty thousand (20,000) in 63 academic departments, 10 faculties, and four colleges and institutes, as well as many non-academic departments and units (University of Calabar Annual Report, 2007). Thus libraries, classrooms, laboratories and the campus are usually overcrowded, which results in a lot of noise in and to the university library. The management of the university library appears not to be managing the problem of noise effectively. New lecture halls and office blocks have been built, but the library still serves as lecture halls, and no measures seem to be in place to reduce noise in the library

The study observed an age bias in respect of response to noise, with younger respondents reporting less disruption than older ones. This result agrees well with those obtained by McNulty (1987), who studied impact of transportation noise and found out that teenagers reported less disruption than older persons. The findings revealed that there was no gender bias with respect to disruption effects of noise in the library. Onuu (2000) similarly found no gender biases in perceptions of road traffic noise. The study also found evidence of adaptation to the noise by the respondents who had stayed longer at the university. Similar results were obtained by Hammad and Abdelazeez (1987), who reported that residents who live or work in boisterous cities for a long time have accepted noise as a way of life and thus report less disruption. In the same vein, McNulty (1987) also reported evidence of adaptation to noise in his study of subjective response to noise.

Most of the library users rated the library as very noisy. These findings are similar to those observed at the Aston University, Birmingham. In a 2005 user satisfaction survey conducted in the university library, 66% of the surveyed students commented that the library was too noisy for quiet study. Many of the students felt that the library was being, but should ideally not be, used as a social place. In the same vein, Ball (2004) commented on the LibQual survey in which over 200 libraries in North America participated that there were many complaints about the noise levels in all areas of the libraries, and that undergraduates rated the libraries as noisy.

The sources of noise mentioned most frequently by the respondents were people, automobiles, airplanes, cell phones and equipment in that order. Noise from people tops the list as most prevalent noise by a very wide margin. These findings are similar to Wright's (2002) observation at the University of Oklahoma. Similar findings were reported by the Aston University Library and Information Services, which confirmed that library was too noisy for quiet study and that many students used the library as a social place (Aston University 2005). Also, the Robert Gordon University conducted a LibQual survey in spring 2003 to identify gaps in and desired expectations of library service. The results show that most students would need a separate study area, which might alleviate noise from other readers while reading. In same vein, in Aberdeen University Library Services Division found, during a noise survey was conducted in 2002, that noisy staff and noisy students are major sources of noise.

Noise from people as a major source of noise in UNICAL library could be due to the fact that many users of UNICAL library act as though they were never introduced to the idea that a library is expected to be a quiet place. Users treat the library as though it were a social forum rather than a place for quiet study. Groups of them quite commonly cluster together and converse at normal conversational levels as though they were in a bar. Students shove their feet and chew gum inside the library. Noise also comes from staff of the library because the library is a teaching environment where librarians must talk to assist users in finding and understanding the information resources. The service desks (circulation, reference, reserve) provide assistance to users, so moderate level of noise is also expected. Also, The UNICAL library serves as lecture halls and classrooms, so there is high level of noise during peak hours. It is also not uncommon to see hawkers near the university library.

The Calabar Free Trade Zone (CFTZ) was commissioned in November 2001. Since then, there has been an upsurge of fairly used vehicles popularly referred to as "Tokumbo" or "Belgium" into Calabar

town and its environs. There is indiscriminate importation of old vehicles and the number of vehicles in Calabar has increased. Also, there is widespread use of horns and siren by motorists, government officials, fire fighters and bullion vans. These explain the high level of noise from automobiles at the UNICAL library.

Noise from airplanes is the third major source of noise at the library. To the west of UNICAL library is the Calabar International Airport. Although the university is not directly under any fly path, noise from airplanes flying at low altitudes could be heard in the university library especially during airplane landing and take-off. Commuters' use of airplanes in Calabar has increased due to establishment of 'TINAPA', a tax-free business and holiday resort that is attracting a lot of tourists to Calabar.

Noise from cell phone is the next major source of noise in UNICAL library. Noise from cell phone as a major source of noise in UNICAL library could be due to the fact that the cell phones policy as announced by UNICAL library administration is not being enforced. UNICAL library regulations regarding the use of cell phones in the library expect owners of cell phones to turn ringers off or set to the lowest volume level while in the university library. Observations by this researcher show that users of UNICAL library do not turn off their cell phones while in the library. Not only do the ringing cell phones disrupt library users' activities, but they also force them to endure listening to cell phone conversations when cell phone owners do not have the decency to leave the reading area to talk. These findings are similar to Vincentia's (2003) report that unprecedented availability of cell phones to students in St. Vincent and the Grenadines has led to noise in schools, and cell phones have become a nuisance. Students complain of not being able to concentrate in schools libraries where every five minutes a cell phone rings. Similar findings were reported by Rochelle (2003).

Noise from equipment is also an important source of noise in the library. In UNICAL library, noise from equipment is mainly due to the many business centres operating in and around the library, which provide services to the university community. Apart from the traffic of customers to these business centres, owners of some of the centres resort to the use of electricity generators during the very frequent public power outages. The high noise levels emitted by these machines add to the overall environmental noise pollution.

## Conclusion and Recommendations

Environmental noise pollution has become very worrisome in UNICAL library, and the high environmental noise conditions negate the purposes for its establishment. The purposes of university libraries as locations for intensive study cannot be achieved without the presence of a quiet environment. The findings of the study reveal that noise levels in UNICAL library are high (43.5 – 88.5 dB{A}) and exceed acceptable standards for educational institutions. The noise constitutes a serious distraction to library users. So, the effectiveness of study and learning processes that take place in the library is likely being compromised.

Based on the findings of this study, the following recommendations that will result in control and abatement of increasing noise levels in the university library are suggested:

- Signs should be posted in each designated zone of the library building indicating the allowable noise level in order that users can make an informed decision on the most suitable area for their use. A sign should be placed in the library reminding users to turn off phones or set them to silent mode upon entering the library.
- Every reasonable effort should be made to ensure that noise is limited to appropriate level. Library staff observing violation of noise policy should remind users of the noise policy, and may suggest a more appropriate area for study. Should the library user refuse to abide by the policy, he or she should be asked to leave the library and if he or she refuses to leave, security should be called. Library users who repeatedly violate the noise policy should have their names and their student numbers recorded by a staff member. The head of their department should be notified and disciplinary action taken.
- Electricity generators and other equipment that generate noise should be housed far away from libraries. Automobiles that emit high noise levels

should be banned from entering the universities.

– The use of noiseless air conditioner, quieter copiers and printers should be encouraged in the library. Screens should be erected around air conditioners, copiers, and printers in the library to help absorb the sound. Engineering measures such as sound insulation and anti vibrating mountings should be fixed in the library buildings. Trees and shrubs should be planted around libraries, as trees help to absorb noise.
– Nigerian universities should sponsor research about noise levels and sources in their libraries and other locations on their campuses towards implementing strategies to control environmental noise.

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