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SUSTAINABLE BUILT ENVIRONMENT

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A STUDY ON NOISE ENVIRONMENT IN THE TEACHING AND LEARNING PROCESS IN UNIVERSITY CLASSROOMS

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ABSTRACT

The purpose of this study is to examine the relationship between classroom noise and student learning. This research is a quantitative and qualitative case study. The actual study is carried out and data gathered by giving questionnaires to respondents made up of 40 students who participated in the case study and by starting an experiment in a university lecture hall. Study data was evaluated by using Microsoft Excel from Microsoft Office 2023. The study identifies noise levels in university classrooms during academic hours and determines student satisfaction in academic classrooms. The results of the analysis are presented in the form of data from the experiment and the total number of respondents. According to the study's findings, noise can interfere with the process of teaching and learning in university buildings and classrooms. This study is significant because it may be used to determine the best ways to develop a workshop to improve teaching effectiveness and student learning. Additionally, it is anticipated that this study will serve as a model for additional research.

Keywords: *Acoustic, Noise, Teaching and Learning, Classroom, Decibels (dB)*

INTRODUCTION

Many educational buildings today are situated close to major areas like cities, shopping districts, and residential neighborhoods. This happens because of the lack of available construction sites to build universities, or due to rapid area growth. A peaceful setting is required for an education building. Faculty activities like lecturing, talking, and teaching sessions are disrupted by noise pollution. Malaysia has an extremely high rate of noise pollution in educational settings. There are few laws and regulations that strictly address noise pollution (Ibrahim, 2020). One of the most commonly-reported workplace hazards is noise. Among the most significant opportunities in a person's life are access to education. However, there is mounting proof that excessive noise levels might harm the learning environment. Classroom noise levels do have an impact on students' learning (Ismail, 2023).

Noise on campus makes it very hard for students to focus on their studies; this is an effect of noise that comes from other classes or noise from outside (Addison et al., 1999). Some universities in Malaysia have a removable shutter between two or three classes. These shutters are removed to create a larger space for examination purposes. Since the shutter does not fully cover the internal wall, noise from one source would easily penetrate the other class. Plus, every educational building is made of wood or concrete which has no sound insulation characteristic (Ibrahim, 2000). The study identifies noise levels in university classrooms during academic hours and determines student satisfaction in academic classrooms. These findings provide an understanding of current classroom environments in universities. The purpose is to allow recommendations to be made regarding possible modifications to existing classrooms.

Noise

Noise is defined as an undesired sound; it can be thought of as an incorrect sound in an incorrect location at an incorrect time. In this study, noise is also defined as sound that an individual finds objectionable. The individual receiving the sound has the discretion to determine whether or not the sound qualifies as noise (Ibrahim, 2000). Numerous studies have been conducted on noise levels in school environments (Sanz and Garcia, 1993). This study involves high noise exposure which has a negative effect on teachers' and students' activities in the school environment, particularly outside activity around the educational facilities. According to the findings of various recent research, certain elementary schools and high schools have acoustics that are unsatisfactory for teachers and some students. Schools with noisy environments cause students a lot of issues when studying. The issue of noise compatibility for schools and its environs has so far received little consideration. The findings also indicate that noise from aircraft or vehicles, as well as noise from classroom activities, is linked to uncomfortable reactions, disruptions of speech and instruction, weariness, and tension. Students, particularly those whose schools are

next to a major road, are the ones who suffer the most. Noise pollution from machinery and huge trucks can interfere with work and induce stress (A. Budiman, 2014).

Level of Noise

Noise is the sound we don't want (it can be said to be noise), so the noise level is the level of sound we don't want. Road traffic, railroads, airports, industrial sites, and home activities all contribute to the perception of noise as a stressor and annoyance with the surroundings (Bhanap, 2013). Urbanization, industrialization, fast housing growth, population expansion, and technology advancements have all been linked to noise pollution. Through a number of methods, environmental noise disrupts social behavior and shows up as psychological and physical diseases. Persistent noise exposure of 85 to 90 dBA may cause alterations in threshold sensitivity and progressive hearing loss. The quantity, variety, and severity of daily activities are related to these annoyance reactions (Yuen, 2014). Table 1 lists some typical noise levels that people encounter every day.

Table 1: Table of Noise Level

Area/Allocation/Environment	Noise Level dB(A)
Housing and settlements	55
Open green space	50
Industry	70
Government and public facilities	60
Recreation	70
Hospitals	55
Education buildings	55

High noise levels in a lecture room can have several negative effects on both students and instructors. These effects can significantly impact the learning environment and the overall effectiveness of the lecture (Ibrahim, 2020). Some of the key effects of high noise levels in a lecture room include:

METHODOLOGY

This method is the commonly used and straightforward option for analyzing quantitative data. To achieve the stated objectives of this research, the following has been conducted.

Data Collection

The research was carried out for one day only. This study used an experiment to obtain the real data and to find the actual information to analyze it. A survey was also included which generally uses instruments such as questionnaires that are filled by the selected respondents. The object of this research was the students in the faculty environment.

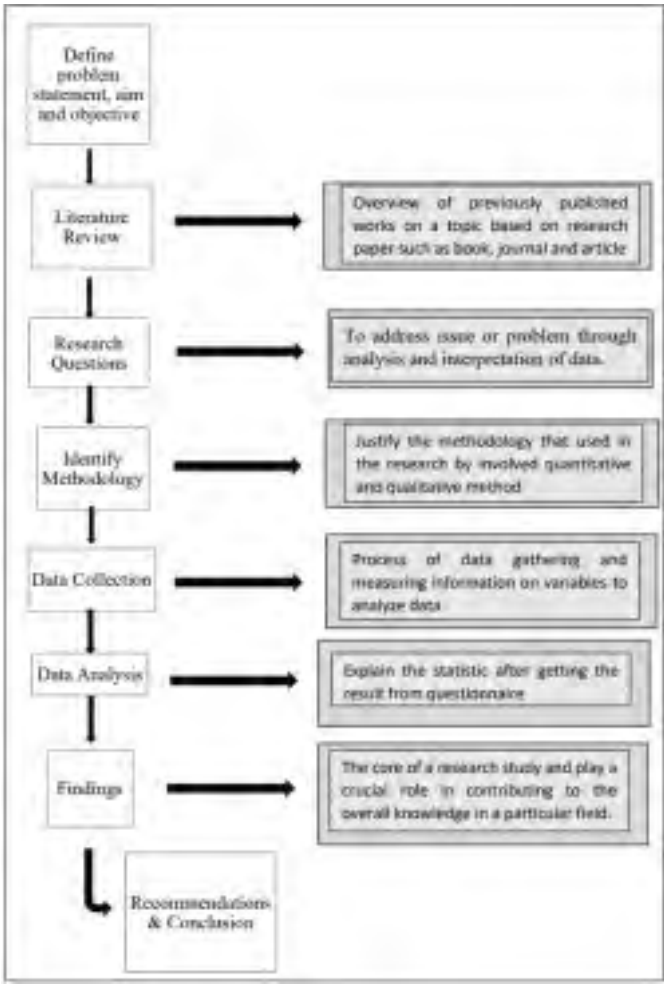

Figure 1: Data Collection

Research Model

Experimental research was chosen as the research model for this study. Experimental research refers to the process by which groups of people identify a problem, attempts to measure and identify the source location, assess how effective the results are, and collect the data to analyze the final results. Measurement is one of the vital elements in developing the research design. Data collection was done by conducting direct measurements using the Sound Level Meter tool (Skarlatos, 2003). Gaining data for the study involved a process called data collection. The questionnaire was distributed to respondents, according to the study. The sample size for this study was 40 respondents; in this case, the students in the classroom (Wang & Brill, 2021).

Figure 2: Sound Level Meter

Sample Size

Gaining data for the study involved a process called data collection. The questionnaire was distributed to respondents, according to the study. The sample size for this study was 40 respondents who are students in the classroom (Wang & Brill, 2021).

ANALYSIS

The function of this data analysis is to identify students in UiTM Seri Iskandar who go to lecture classes in Annex 1 which is the Faculty of Architecture. The section focuses on the respondents' profiles. This is information about their backgrounds. The

variables included in the demographic background consist of gender, level of study, student enrolment, semester, and student status.

The total population of respondents from the case study in UiTM Seri Iskandar is 40 students. The gender breakdown shows that 62.5% (n = 25) of the respondents are male and 37.5% (n = 15) of them are female. The level of study of the students indicates 62.5% (n = 23) of the respondents are studying for their degrees and the rest (37.5%; n = 15) are evenly divided between diploma, master and PhD students. Meanwhile, for student enrolment, there are two categories of students in UiTM which are full-time and part-time students. The percentage of full-time students is 75% (n = 30) while part-time students make up about 25% (n = 10) of the respondents.

Table 2: Demographic Data of the Respondents

Profile		Frequency (Number of Respondents)	Percentage (%)
Gender	Male	25	62.5
	Female	15	37.5
Level of Study	Diploma	5	12.5
	Degree	25	62.5
	Master	5	12.5
	PHD	5	12.5
Student Enrolment	Full-Time	30	75
	Part-Time	10	25
Semester	1-2	5	12.5
	3-4	10	25
	5-6	20	50
	7-8	5	12.5
Students Status	Residents	27	67.5
	Non-Residents	13	32.5

A majority of the respondents are in semesters 5-6 with 50% (n = 20), followed by respondents from semesters 3-4 who make up 25% (n = 10) of the total. For semesters 1-2 and semesters 7-8, the number of respondents for both shows the same result with 12.5% (n = 5). For student residential status in UiTM Seri Iskandar, mostly the respondents are staying within the campus area, i.e. they are residents and make up 56.7% (n = 17) of the population, while respondents who are staying outside of the campus area or are non-residents totals to 13 people (43.3%).

- Noise Comfort

Figure 3: Noise Comfort

From the figure, most respondents answered “Really Disagree” with 11 respondents choosing this statement followed with 10 respondents for “Disagree”, 9 respondents for “Neutral”, 6 respondents for “Agree” and 4 respondents for “Really Agree”.

- Concentration in Classroom

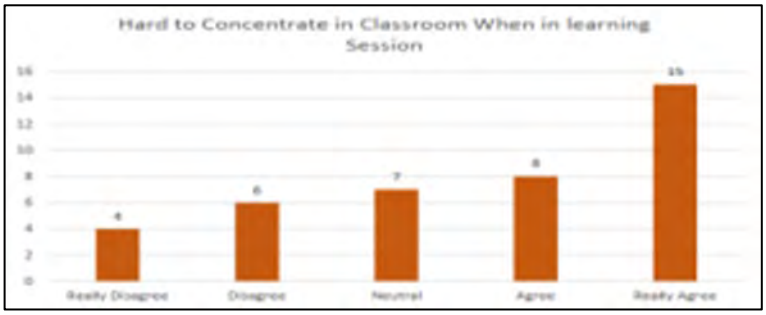

Figure 4: Concentration

Figure 4 shows that 15 of 40 respondents chose “Really Agree” with the statement. Eight respondents answered “Agree”, 7 respondents for “Neutral”, “Disagree” with 6 respondents, and 4 respondents for “Really Disagree”.

- Stay Calm in the Classroom

Figure 5: Stay Calm in the Classroom

From Figure 5, the highest number of respondents (16) answered “Really Disagree” followed by “Disagree” with 11 respondents. Nine respondents chose “Neutral”, 3 respondents for “Agree” and only 1 respondent chose “Really Agree”.

- Enjoy Learning Session

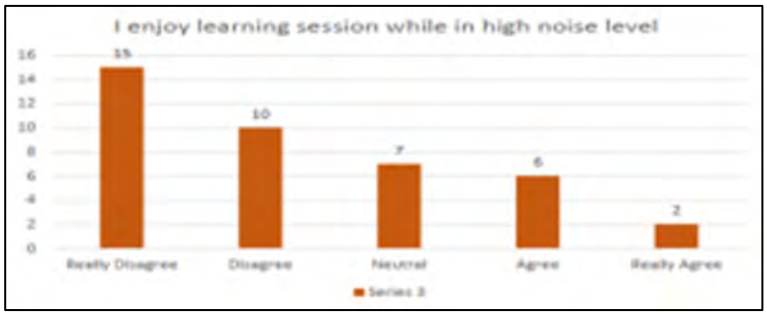

Figure 6: Enjoy the Learning Session

Based on bar chart 3, 15 respondents answered “Really Disagree” followed by “Disagree” with 10 respondents. Seven respondents chose “Neutral”, 6 students chose “Agree” and “Really Agree’ was the least chosen with 2 respondents.

- Next Class Noise

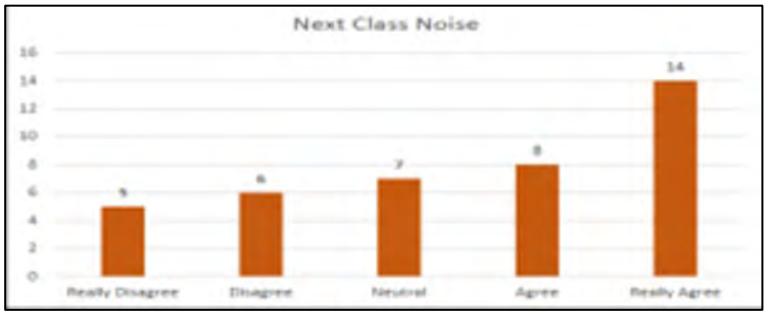

Figure 7: Next Class Noise

In this figure, most students “Really Agree” that some noise comes from the next class, with 14 respondents followed by 8 respondents having chose “Agree”, 7 respondents for “Neutral”, 6 respondents for “Disagree” and 5 respondents chose “Really Disagree”.

- Noise Disturbance

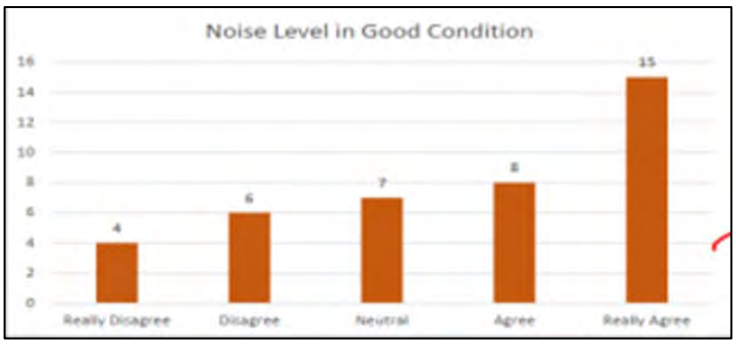

Figure 8: Noise Disturbance

This figure shows that 15 out of 40 respondents chose “Really Agree”, followed by 8 respondents who chose “Agree”, 7 respondents who chose “Neutral”, 6 persons who answered “Disagree” and the least chosen answer is “Really Disagree” with 4 respondents.

- Measurement

The final process is evaluating the results of the study. The data were manually collected by recording noise using the Noise Level Meter. This collection was done over one day from morning until evening. All observed data were entered into Microsoft Excel and SPSS and analyzed.

Table 3: Data insight for two classrooms

Time	AP 110 Class	Next class
10.00 a.m.	60	55
12.00 a.m.	60	70
2.00 p.m.	61	75
4.00 p.m.	60	78

DISCUSSION

Based on the result in Table 3, the noise level in the AP 110 room at 10 a.m. is at 60 dB, higher than the noise from the next class which is only at 55dB. This is because at 10 a.m. on Tuesday, there was no lecture in the next class. Only the AP 110 class had a lecture in the morning. At mid-day (12.00 p.m.), the AP110 class still gives the same results which is 60 dB. Meanwhile, the next class produces a higher level of noise at 70 dB. This is because the next class had a lecture at the time with many students in the class. For the afternoon at 2.00 p.m., the main class still had the same noise level which is 61 dB even though there were no students in the class and the noise level from the next class is higher at 75 dB because the next class was too loud with an ongoing lecture in the class. In the evening at 4.00 p.m., the noise from the main class was still static at about 60 dB but the noise from the next class was higher than before at 78 dB. This is because the next class produced noise from the lecture and also sound from the air conditioner system.

CONCLUSION

In conclusion, measuring the noise level in a classroom is a vital step in identifying and establishing the standard noise level for an optimal learning environment. By conducting a comprehensive analysis of the data collected during the noise level experiment, valuable insights can be gained to interpret the results and make informed decisions regarding noise management. The process of measuring noise levels provides quantitative data that allows for a thorough understanding of the acoustic conditions within the classroom. It helps to determine the baseline noise level and identify any potential areas of concern or excessive noise sources that may hinder the learning experience. After analyzing the data, it is crucial to compare the measured noise levels with established standards or guidelines for educational environments. These standards serve as benchmarks and help to determine whether the noise levels fall within an acceptable range, or if corrective measures need to be implemented.

Continued monitoring and periodic reassessment of the noise levels will allow for ongoing evaluation and adjustment of the noise management strategies to maintain an optimal learning environment. So, measuring and analyzing the noise levels in a classroom provides a scientific basis for understanding the acoustic conditions and evaluating the impact of noise on teaching and learning. By interpreting the results, educational institutions can implement targeted measures to reduce noise and create a conducive environment that fosters effective learning and enhances the overall educational experience for students and educators.

The study highlights the importance of implementing effective sound systems, including high-quality microphones and properly calibrated speakers, to ensure clear and intelligible communication between lecturers and students. The implications of the research suggest that reducing noise levels in a lecture hall has the potential to improve student concentration, information retention, and overall learning outcomes. By creating a quieter and more acoustically balanced environment, educational institutions can foster an atmosphere that promotes active engagement and facilitates effective knowledge transfer. The study emphasizes the significance of addressing noise levels in a lecture hall to optimize the teaching and learning experience. By implementing appropriate noise reduction strategies and creating a more acoustically favorable environment, educational institutions can enhance the overall educational experience, foster effective communication, and facilitate improved learning outcomes for students in a lecture hall setting.

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