



INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
KULLIYAH OF ENGINEERING

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PROJECT PROPOSAL

SMART NOISE LEVEL INDICATOR IN
LEISURE READING AREA, IIUM LIBRARY

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PREPARED BY :

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1. Introduction

The library is a place for concentration, learning, and reflection. However, maintaining quietness in shared spaces such as the Leisure Reading Area can be difficult when users unintentionally talk or make noise. To address this, our group proposes the installation of a **Smart Noise Level Indicator** that encourages self-awareness among library users. The system will use sensors and LED indicators to display the current noise level, reminding everyone to respect the quiet environment and support effective learning for all.



Figure 1 : Leisure Reading Area In IIUM Library.

2. Problem Statement

Noise pollution in study spaces negatively affects students' focus and productivity. In the Leisure Reading Area of the IIUM Library, there is currently no visual feedback system to alert users when noise levels are too high. This often results in discomfort among those seeking a peaceful study environment. A simple, automated noise indicator can help promote respectful behaviour and awareness without requiring constant staff intervention.

3. Objectives

1. To identify the noise-related issues in the Leisure Reading Area of the IIUM Library by conducting a preliminary survey among library users.
2. To design, develop, and install a Smart Noise Level Indicator system that detects and displays real-time noise intensity using sound sensors and LED indicators.
3. To evaluate the effectiveness of the Smart Noise Level Indicator in improving noise awareness and reducing disturbance, based on feedback gathered through a post-project survey from library users.

4. Project Description / Methodology

4.1. Preliminary Survey

Based on survey responses from *Figure 2*, the findings highlight a clear need for improved noise management in the IIUM Library. 28 respondents (60.9%) visit the library rarely, about 1–2 times a month, while 10 (21.7%) come occasionally and 8 (17.4%) visit 3 to 5 times a week, indicating that the Leisure Reading Area still receives consistent traffic. More than half of the respondents (*refer to Figure 3*), 25 students (54.3%), reported experiencing noise disturbances while studying, confirming that noise is a recurring issue.

The impact of noise on concentration is also significant: only 5 students rated the effect as 1 and 3 rated it as 2, while the majority rated it moderately to strongly disruptive, with 17 students giving a rating of 3, 14 giving a 4, and 7 giving the highest rating of 5 (*Figure 4*). Students identified the main noise sources as conversations (34 respondents), movement of chairs (29), loudness without awareness (28), group discussions in quiet zones (26), and phone calls (15), showing that disruptions mostly stem from common behaviors rather than rare incidents (*Figure 5*).

Encouragingly, when asked about their willingness to lower their voices if a noise level indicator with a red warning light were installed, none chose levels 1 or 2, while 7 selected level 3, and the vast majority responded positively with 20 choosing level 4 and 19 choosing level 5, demonstrating strong student support and a high likelihood that such a system would effectively promote quieter and more mindful use of the library space (*Figure 6*).

2. How often do you use IIUM library?

46 responses

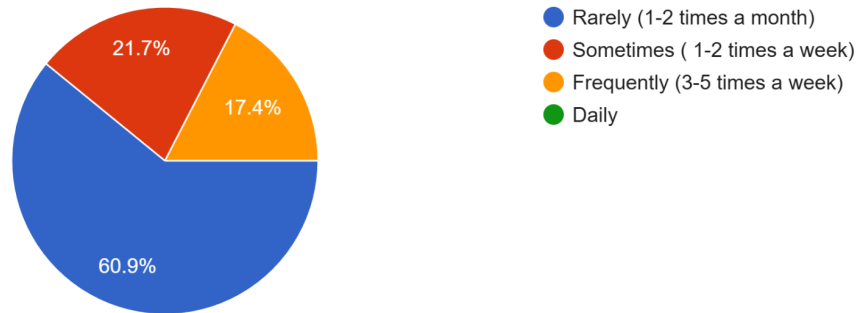


Figure 2 : Pie Chart of IIUM Library usage.

3. Have you ever experienced noise disturbance while studying in the library or quiet areas?

46 responses

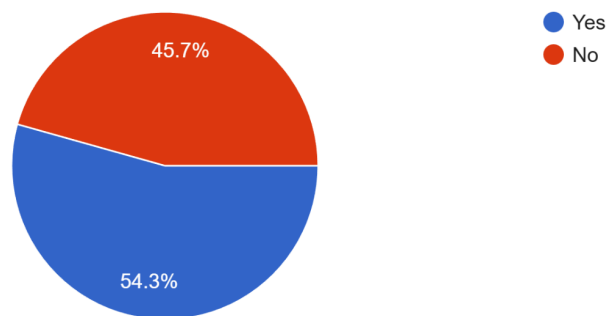


Figure 3 : Reports of noise disturbance by students .

4. How much does noise affect your ability to focus when studying?

46 responses

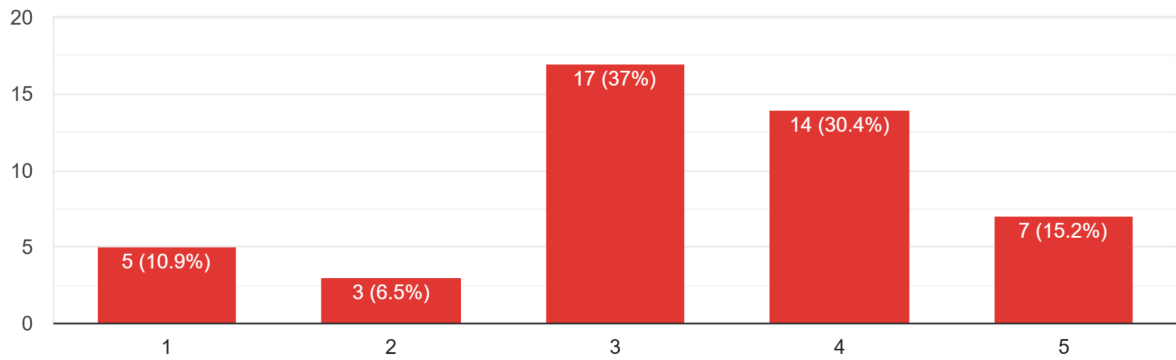


Figure 4 : Effect of noise towards studying.

5. In your opinion, what are the main causes of noise in quiet study areas?

46 responses

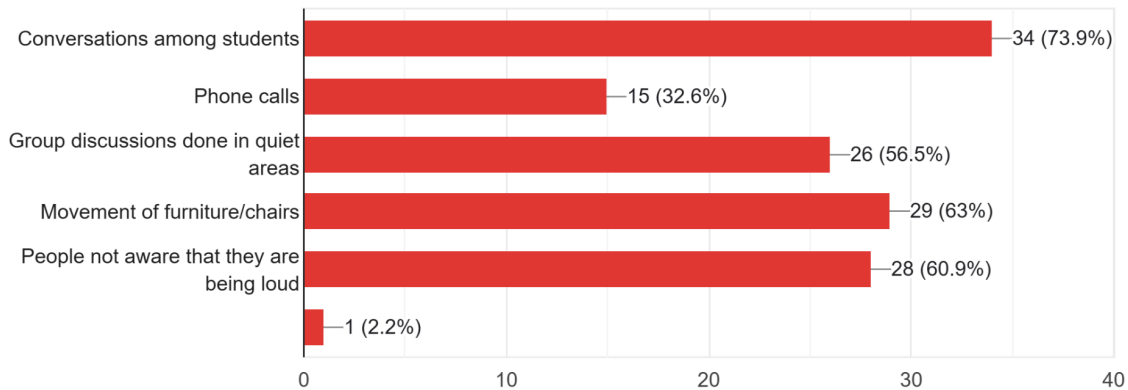


Figure 5 : Factors causing noise disturbance.

7. How likely are you to adjust your volume if you see a RED light indicating high noise level?

46 responses

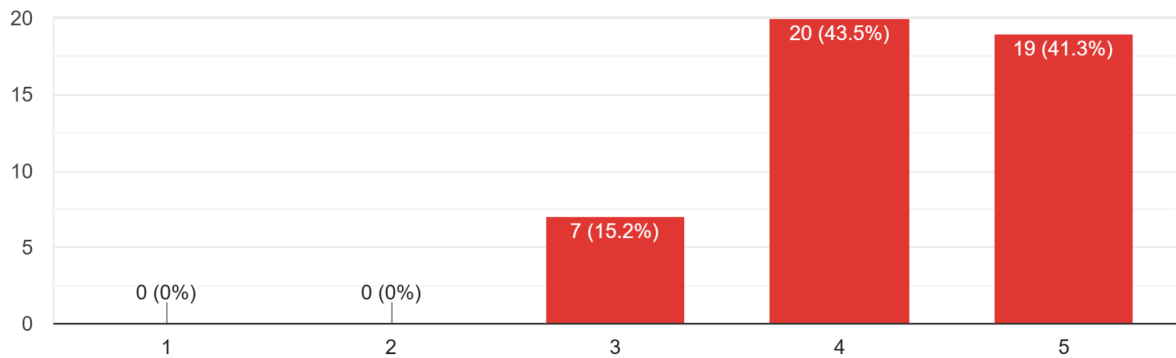


Figure 6 : Graph shows demand from students for a noise level indicator.

4.2. System Design

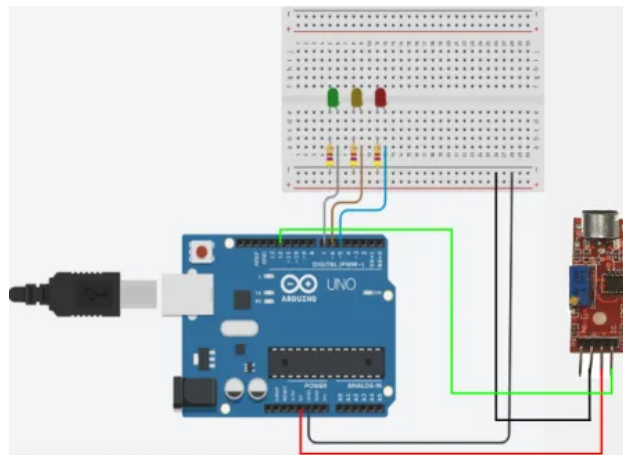





Figure 7: Proposed Circuit Diagram

The project will utilize an Arduino UNO microcontroller connected to a 3-pin KY-037 sound sensor to detect ambient noise levels in the library.

Three LED indicators will display the current noise condition:

-  *Green* – Quiet (acceptable noise level) - optional
-  *Yellow* – Moderate (reminder to lower voices) - optional
-  *Red* – Loud (noise exceeds the limit)

The KY-037 sensor's threshold will be adjusted using its onboard potentiometer to suit indoor library conditions. The Arduino will continuously monitor the sensor's digital output and control the LEDs to reflect the current noise condition in real-time..

4.3. Prototype Development

The prototype will be developed by assembling the Arduino UNO, KY-037 sound sensor, and LED indicators into a functional circuit. The system will be tested under various noise conditions to ensure that each LED responds accurately according to the noise level detected. To enhance durability and portability, the components will be encased in recycled or lightweight materials, such as a plastic or wooden box. The device will be powered using a 5V USB adapter to ensure stable and continuous operation.

4.4. Installation

The completed system will be installed permanently in the Leisure Reading Area of the IIUM Library with permission from the library management. The device will be positioned at an appropriate height to ensure reliable detection of ambient noise levels. A USB adapter will be used to maintain stable power supply throughout its operation.

4.5. Evaluation

The effectiveness of the Smart Noise Level Indicator will be evaluated through observation of changes in user behaviour, such as reduced noise and improved awareness. A follow-up survey will also be conducted to measure user satisfaction and gather feedback on the system's impact.

4.6 Gantt Chart

Table 1: Gantt Chart of the Project

| Activity | Week | | | | | | | | | | | | | |
|--------------------------------|------|---|---|---|---|---|---|---|---|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Planning and design of program | | | | | | | | | | | | | | |
| Inform IIUM Gombak Library | | | | | | | | | | | | | | |
| Proposal Drafting | | | | | | | | | | | | | | |
| Preliminary Survey | | | | | | | | | | | | | | |
| Prototype Development | | | | | | | | | | | | | | |
| Installation | | | | | | | | | | | | | | |
| Evaluation | | | | | | | | | | | | | | |
| Report and Documentation | | | | | | | | | | | | | | |
| Presentation and Submission | | | | | | | | | | | | | | |

5. Budget Estimate

Table 2: List of items and cost estimation

| Item | Quantity | Estimated Cost (RM) |
|---------------------------------|----------|---------------------|
| Arduino UNO board | 1 | 35.00 |
| Sound sensor module | 1 | 3.00 |
| LED lights (red, yellow, green) | 3 | 5.00 |
| Jumper wires (set) & breadboard | 1 | 10.00 |
| Power supply / USB adapter | 1 | 15.00 |
| Enclosure (recycled material) | 1 | 0.00 |
| Total Estimated Cost | | RM 68.00 |

6. Beneficiaries / Stakeholders

- **Primary:** IIUM students and staff who use the library.
- **Secondary:** Library management and maintenance team.
- **Tertiary:** The project team members who gain hands-on engineering, teamwork, and ethical learning experience.

7. Expected Outcomes

This project is expected to increase awareness among library users about the importance of maintaining quietness. A noticeable reduction in noise levels is anticipated in the Leisure Reading Area, contributing to improved focus and comfort for students. Additionally, the project offers a sustainable and replicable solution that can be implemented in other zones of the library or similar environments.

8. Sustainable Development Goals (SDGs) Alignment

This project aligns with several Sustainable Development Goals. Under SDG 3: Good Health and Well-being, the system contributes to a peaceful environment that reduces stress and mental fatigue. It supports SDG 9: Industry, Innovation and Infrastructure by applying engineering technology for public benefit. The project also promotes SDG 11: Sustainable Cities and Communities by encouraging responsible and respectful use of shared spaces.

9. Islamic Perspective

The project reflects the Islamic value of *Itqan* (excellence) which means doing work with precision, sincerity, and responsibility. By ensuring a high-quality design that serves the comfort and well-being of others, this initiative also embodies the concept of *Maslahah Ammah* (public good). As engineers and students, upholding *Itqan* in this project represents our role as *Khalifah* (stewards) in contributing to a harmonious, ethical, and sustainable community.

10. Team Members and Roles

| No. | Name | Role | Responsibility |
|-----|-------------------------------------|-----------------|---|
| 1. | Ibrahim Bin Nasrum | Team Leader | Assign members, facilitate jobs based on timeline |
| 2. | Muhammad Rafiq bin Mohd Jamal | Public Relation | Official letters, Surveys |
| 3. | Sofiyah Binti Zamara | Technical | Develop product and testing |
| 4. | Ahmad Faez Zulhakim bin Ahmad Badli | Technical | Develop product and testing |

11. Conclusion

The Smart Noise Level Indicator project aims to promote a respectful, calm, and focused study environment in the IIUM Library through a simple yet effective technological solution. By combining engineering principles with ethical and Islamic values, this initiative contributes to both educational comfort and community well-being.

12. References

1. Dar al-Hikmah Library, IIUM. (2025). Leisure reading collection. International Islamic University Malaysia. <https://division.iium.edu.my/lib/leisure-reading-collection/>
2. Lyra, A. (2022, May 25). Sensor de som acendendo um LED (Arduino). Vidadesilício. <https://portal.vidadesilicio.com.br/sensor-de-som-acendendo-um-led-arduino/>

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