FYP FSB

DETERMINATION OF INDOOR DISTURBANCE LEVEL USING NOISE MONITORING DEVICE IN UMK JELI AND PENGKALAN CHEPA CAMPUS LIBRARY

By

WAN NUR ATIQAH BT WAN MOHD NOR

A report submitted in fulfillment of the requirements for the degree of Bachelor of Applied Science Sustainable Science

FACULTY OF EARTH SCIENCE

UNIVERSITI MALAYSIA KELANTAN

2017

UNIVERSITI MALAYSIA KELANTAN

DECLARATION

I declare that this thesis entitled Determination Of Indoor Disturbance Level Using Noise Monitoring Device In Umk Jeli And Pengkalan Chepa Campus Library is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature: _____

Name: _____

Date: _____

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

ACKNOWLEDGEMENT

All praises are solely for the Almighty God who helped me to complete the Degree in Sustainable Science and the research went successfully.

First and foremost, I have to thank my research supervisors Mdm. Farah Khaliz bt Kedri. Without her assistance and dedicated involvement in every step throughout the process, this paper would have never been accomplished. I would like to thank you very much for your support and understanding over these past two semesters. Thank you for giving me and my friend's chance to expose to the real world by joining the conference. It worth a memory.

I would also like to thanks to my both my research friends, Nurul Khairun'nisa bt Zunaidi and Nur Nasuha Allyia bt Mohd Shabrry, for their time, support and patience, encouragement and their inspiring words to motivate me to do better which lightened me up towards the right track. I also would like to thank all my best friends who are there accompanying to go to the both libraries, for all the fun and laughter behind the bitter reality of university life that we are all facing. Thank you for always making me smile behind my tears and for making me realize what the true meaning of friendship is.

Most importantly, none of this could have happened without my family. My parents who offered me a piece of advice through phone calls every time I face difficulties in completing my research studies. They did not let me to give up and I am forever grateful. This dissertation stands as a testament to your unconditional love and encouragement.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

TABLE OF CONTENTS

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

LIST OF TABLES

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

LIST OF FIGURE

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

LIST OF ABBREVIATIONS

UMK	Universiti Malaysia Kelantan
UMKKJ	Universiti Malaysia Kelantan Kampus Jeli
UMKPC	Universiti Malaysia Kelantan Kampus Pengkalan Chepa
DOE	Department of Environment
GPS	Geographical Point System
WHO	World Health Organization
ANOVA	Analysis of Variance
Leq	Equivalent Continuous Noise Level

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

LIST OF SYMBOLS

dB(A)	Decibel
<	Less than
m	Meter(m)

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

Determination Of Indoor Disturbance Level Using Noise Monitoring Device At Umk Jeli And Pengkalan Chepa Campus Library

ABSTRACT

Noise pollution is one of the pollution that mostly comes from human activities which it can cause harm as well as interruption of peacefulness especially to human. As a higher-learning institution, both UMK libraries should preserve its learning environment and tranquil atmosphere so that it is not disconcerting students' concentration. For this reason, a study was conducted for three months (May, June, and July, 2016) in UMK library by measuring the noise pollution level. This study was accomplished by analyze noise level and identify the sources that cause noisiness. The noise level was taken at three different time that is in the morning, evening and at night to see the difference of noise level between those time. It was found that the noise level in both libraries is different based on time. The highest noise level was in UMKPC library as all the average sound level recorded was exceeding the standard stated by WHO. The mean sound level recorded in May was the highest (51.92 dB (A)), followed by June (49.16 dB (A)) and July (34.32 dB (A)) for both libraries. It shows that the noise level in UMKPC library was exceeded as it always exceeding the noise level stated by WHO. The study also showed that there was a significantly difference data which the value calculated (0.00) was below than the p-value < 0.05. The major factor causing this noise pollution is the space provided in both UMK libraries. A few methods to boost this study were suggested so that it can be carried out to get preferable situation especially for UMK students.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Penentuan Paras Gangguan Tertutup Menggunakan Peranti Pengawasan Bunyi Di Perpustakaan UMK Kampus Jeli Dan Pengkalan Chepa

ABSTRAK

Pencemaran bunyi merupakan salah satu pencemaran yang berpunca daripada aktiviti manusia yang boleh menganggu ketenteraman dan mendatangkan kemudaratan khasnya kepada manusia. Sebagai sebuah institusi pengajian tinggi, kedua-dua perpustakaan UMK perlu mengekalkan persekitaran dan suasana pembelajaran yang tenang agar tidak mengganggu tumpuan pelajar. Oleh yang demikian, satu kajian telah dilaksanakan selama tiga bulan (Mei, Jun, Julai, 2016) di perpustakaan UMK dengan mengukur paras pencemaran bunyi. Kajian ini dilaksanakan dengan menganalisa paras bunyi bising dan mengenalpasti punca-punca yang menyebabkan berlakunya bunyi bising. Pencerapan paras bunyi bising di ambil pada tiga waktu berbeza iaitu pada waktu pagi, petang dan malam untuk melihat perbezaan paras bunyi bising antara waktu-waktu tersebut. Melalui kajian ini didapati bahawa paras bunyi bising di kedua-dua perpustakaan adalah berbeza mengikut masa pencerapan. Paras bunyi yang paling bising adalah di perpustakaan UMKPC yang mana keseluruhan purata yang direkod melepasi paras yang ditetapkan oleh WHO. Purata paras bunyi yang direkod pada bulan Mei merupakan yang paling tinggi (51.92 dB (A)), diikuti bulan Jun (49.16 dB (A)) dan Julai (34.32 dB (A)) untuk kedua-dua perpustakaan. Kajian ini menunjukkan bahawa paras bunyi bising di perpustakaan UMKPC adalah tidak sejajar kerana ianya sering melepasi paras bunyi yang ditetapkan oleh WHO. Kajian juga menunjukkan bahawa terdapat perbezaan signifikasi yang mana nilai yang dikira (0.00) adalah rendah daripada nilai $p<0.05$. Punca utama yang menyebabkan pencemaran bunyi ialah ruang yang disediakan di kedua buah perpustakaan. Beberapa cadangan telah disarankan untuk memperbaiki lagi kajian ini, diharapkan ia dapat dilaksanakan dan dapat memberikan persekitaran yang tenang khususnya kepada pelajar UMK.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

CHAPTER 1

INTRODUCTION

1.1 Background of study

Noise pollution is a type of the pollution that comes from human activities that is parallel with rapid development and population increase nowadays. This pollution can cause harm and disruption of peacefulness especially to human being.

Generally, noise pollution is defined as the unwanted and disturbing sound (Dursun *et al.*, 2006; Stansfeld & Matheson, 2016) which its level is higher compared to the normal level of sound which human can tolerate with and it also gives negative impact to people and society (WHO, 2001; WHO, 2002). It is also briefly described as harmful or annoying levels of noise (Singh & Pandey, 2013). Noise pollution is contributed by airplane, industry, transportation systems, motor vehicles and machines, community sources or leisure sources (WHO, 2011). The excessive noise may disturb the activity or balance of human and animal health in their ecosystem.

Institutional places such as school, universities and colleges are one of the places which must put their main concerns in preventing noise pollution. This is because, an institutional places should have a tranquil yet comfortable area for students to focus in their study. Noise inside schools can be considered as important physical and psychological stressors which may play critical role in students' health, behaviors and performance (Alsubaie, 2014) as these factors may affect the students achievement in their studies. Noises also play an important physical environmental factor and have a critical role in student's health and academic performance (Alsubaie, 2014). A recent

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

study by (Sanz *et al.*, 1993; Romero & Lliso, 1995) has proven that noise has a disastrous effect on the students' attention.

Noise pollution is different from other environmental pollutions as it is invisible and odorless which does not have any residuals and does not pollute soil and water. Noise pollution also recognized as one of the major problem which affect the quality of life in urban areas all over the world (Ozer *et al.*, 2009). Thus, this problem concerns everybody, from ordinary citizen to the highest position official and demands responsibilities to everyone towards future generations. For this reasons, it should be everybody's task that the ambient environment which human beings live in should be natural and clean, and kept away from every kind of pollution including noise (Pettersson, 1997).

The effects of noise pollution, on human health, can be further categorized into three major groups, which are auditory, physiological, and psychological (Bulunuz, 2014). In contrast with (Job, 1996; Evans & Hygge, 2000; Stansfeld *et al.*, 2000; Quis, 2001), the study has stated four categories instead of three which including effects on work performance. The intensity of sound is associated with the mechanical stress reaching the tympanum directly, and is measured by decibel (dB (A)) units (Bulunuz, 2014). Former researcher also stated that the unit dB (A) stands for decibel, the unit of measurement of sound (Mappala & Javier, 2010).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

1.2 Problem statement

In university area especially in library it is known that the students are supposed to be in a silent mode. This is because libraries serve as amenities to students who need full concentration on what they are doing. Lack of cooperation among students themselves is also a major contribution to the noise pollution inside the library. Noise is also one of the most common complaints library administrators hear from students because library itself serves as student individual's study places.

Furthermore, the problems inside the library arise from the surrounding itself. Based on observation, rapid development was continuously to take place in the UMK campus. Construction was taken place as data was collected in the library. Unconditionally, the sound produced in the construction site might affect the sound level recorded.

This study was conducted in UMK Jeli and Pengkalan Chepa Campus library to analyze the level of the noise pollution and to determine the sources of noise that contribute to the noise pollution. This was to ensure that the problem that is currently happening in the library could be prevented.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

1.3 Objectives

1. To record and analyze the noise level in both Universiti Malaysia Kelantan Jeli and Pengkalan Chepa Campus libraries during academic and holiday session.
2. To compare the noise level in Universiti Malaysia Kelantan Jeli and Pengkalan Chepa Campus libraries by following World Health Organization, WHO (1999) noise standard level.

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

CHAPTER 2

LITERATURE REVIEW

2.1 Pollution

Environmental pollution especially noise pollution continues to be one of the most important problems for mankind (Gümgüm, 2012). Pollution itself refers to the existence of substances, organisms or forms of energy to substrates or media they do not belong to or exceeding their typical quantities, for enough time and under conditions that allow interfering with health and comfort of people, damaging natural resources or altering the ecological balance of an area (González, 2014).

According to Environmental Quality Act 1974, pollution is described as any direct or indirect amendment of the physical, thermal, chemical or biological properties of any part of the environment. This can be done by releasing, exuding or depositing environmentally rugged substances, toxic waste or wastes so as to effect any beneficial use adversely which later it can cause a condition that is dangerous or potentially hazardous to public well-being and security or welfare to the flora and fauna.

2.2 Noise characteristics

A sound involves the transferring of energy which travels through a medium like air without mass transfer. Also, sound is described as a pressure alteration which is wave that are moving through the air and it can be discovered by human ear and sound pressure is proxy for acoustic energy (Breysse & Lees, 2006).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Sound is differing from noise and sound is characterized by vibration, periodicity and also duration (WHO, 2002). World Health Organization (2002) also described noise as one of the mechanisms of vibration propagated by elastic media such as air and water which then these components will alters the pressure to be recognized by human. Physical manifestation of noise is a pressure wave caused by vibrating surfaces (Breysse & Lees, 2006). Two important characteristics of noise are frequency and loudness.

The physics of sound as stated above will then cause the vibration of a source causes pressure changes in air which result in pressure waves that carrying varying characteristics (Breysse & Lees, 2006).

2.2.1 Noise measurements

Noise is commonly defined as any undesirable or unwanted sound (WHO, 2002). Also, noise is one of the most widespread environment problems in the working place (WHO, 1980). Three aspects of noise are used in assessing the community noise environment which is level, frequency and variations (Breysse & Lees, 2006). A noise exposure may thus be extremely disturbing in education when the noise masks auditory information required for the ongoing activity (Lundquist *et al.*, 2000).

Sound levels are measured and expressed in decibels, dB(A) with 10 dB(A) roughly equal to the threshold of hearing (Lemoore, 2010). A decibel unit corresponds to a ratio of two forms of power electric or an acoustic signal corresponds to 10 times the logarithm of the ratio.

Figure 2.1 below shows the characteristics of both noise and sound. The ear represents as the frequency analyzer which the eardrum splits the tones and conduction

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

in two different ways which is by the nervous system and also by the bones. As we concerned, different people's ears differ in their degree of vulnerability to noise, noise exposure levels that are well tolerated by some people may cause harm in others. In a simple word, we can say that different people may be harm and each of them will affect according to the ear which they can tolerate.

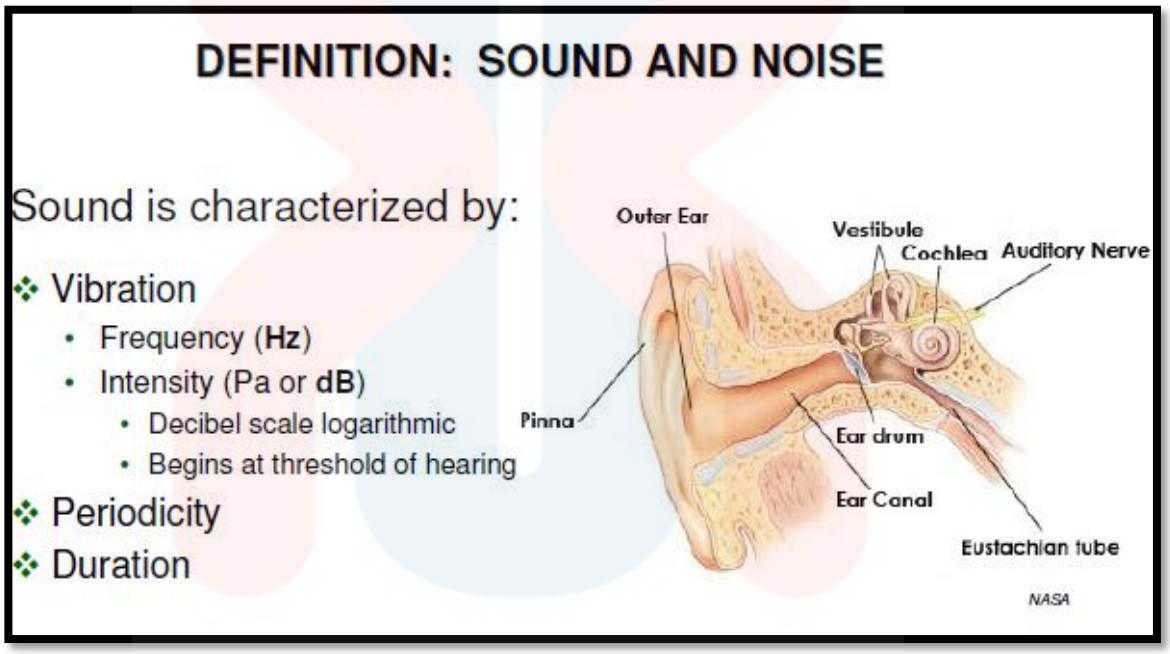


Figure 2.1: Sound characteristics (WHO, 2002).

Frequency is a composition or spectrum of the sound and is a measure of the pressure fluctuations per second, measured in units of hertz (Hz) (WHO, 2002). While variation in sound level with time, measured as noise exposure. Most community noise is produced by many distant noise sources that change gradually throughout the day and produce a relatively steady background noise with no identifiable source (Lemoore, 2010). In spite of this, Leventhall in his studies has demonstrated human ear should be sensitive to much lower frequencies for very loud intensities (Leventhall, 2004). The

table below (Table 2.1) showed the sound pressure level, dB(A) which human ear can tolerate.

Table 2.1: Sound Pressure Level, dB (A)

Sound Pressure Level, dB(A)	Typical Source	Subjective Evaluation
140	Long range gun, gunner's ear	
130	Threshold of pain	Extremely noisy to intolerable
120	Jet take-off at 100m	
110	Night club dance floor	
10	Loud car honk at 3m	Very noisy
90	Heavy truck at 10m	
80	Curbside of busy street	Loud
70	Car interior	
60	Normal conversation at 1m	Moderate to quiet
50	Office noise	
40	Living room in quiet area	Quiet to very quiet
30	Inside bedroom at night	
20	Unoccupied recording studio	Almost silent

(Source: WHO, 2002)

The table stated above (Table 2.1) shows that the value of the sound pressure level, dB(A) which can be tolerated by a normal human. Human ear can receive sound up to only to 80 dB(A) and above that can cause hearing damage to human. Besides, the noise which human can receives is depends on few factors connecting to the man which is their age, gender and mood of the person itself (Debnath *et al.*, 2012). With that, noise become a baseless interferences and imposition upon human health, comfort and qualitative of human life (Gorai & Pal, 2006).

2.2.2 Loudness and Sound Intensity (Power)

The relative loudness that we perceive is a subjective psychological phenomenon, not something that can be objectively measured. The level of a sound expressed (Table 2.2) in dB(A) is a reasonable measure of the loudness of that sound.

Different sounds having the same dB(A) level generally sound about equally as loud, although the character of the noise also plays a part in its perceived loudness (Mac, 2010).

Moreover, sound itself can be produced by sources which have a very low acoustic power such as deafening claxon (Albert, 1997). Claxon is a kind of loud horn which has been formerly used on motor vehicles that makes a loud warning sound. Table 2.2 below showed the noise dose exposure levels, dB(A) where human can be exposed in a certain time.

Table 2.2: Noise Dose Exposure Levels, dB(A)

Noise Level, dB(A)	Maximum Exposure Time per 24 hours
85	8 hours
88	4 hours
91	2 hours
94	1 hour
100	30 minutes
103	15 minutes
106	7.5 minutes
109	3.7 minutes
112	112 seconds
115	56 seconds
118	28 seconds
121	14 seconds
124	3 seconds
127	1 second
130-140	Less than 1 second
140	NO EXPOSURE

(Source: Noise Help, 2010)

From the table (Table 2.2) too, it is stated that at 91dB(A), human ear can only tolerate up to two hours of exposure while if human are exposed to the 140 decibels at less than one second, immediate nerve damage can occur thus make one life difficult. The one who are exposed to high level of noise for a long period of time may cause temporarily or permanent deafness (Mappala & Javier, 2010).

2.3 Noise pollution

Noise when exceeds the recommended level becomes pollution. Noise pollution is one of the environmental hazards affecting human (Obot & Ibanga, 2013). Noise is a form of air pollution and many times given least preference in comparison of other type of pollution problems. Sound becomes noise when it interferes with normal activities (Tripathi *et al.*, 2014). In addition, the noise is dominated by voices with frequency and informational characteristics and that will make the risk for hearing impairment and annoyance highly pronounced (Sjödin *et al.*, 2012).

Noise is concisely describes as unwanted and unpleasant sound causing nuisance and disturbance to the receiver (Akhtar *et al.*, 2011). It become unwanted because it annoys people, disturbing the conversation, cause stress and yet threatens public health. The rapid growth and development of nation in terms of industrialization, urbanization and commercialization of places has given birth to various types of pollution, which continue to modify the environment, the noise pollution is one of them (Tripathi *et al.*, 2014). Environmental noise is considered to be unwanted harmful sound in outdoor spaces, generated by human activities and including noise from roads, railways, aircraft, and factories (Kim, 2015).

Noise features different characteristics that make it different from every other pollutant. Noise is invisible, it does not smell, it disappears when the source is turned off and leaves no traces in the environment (González, 2014). In the study, Gonzalez (2014) also stated that this fact contributes to strengthening the misconception that noise is not

harmful to human health or, at least, efforts and funds aim preferably at controlling and decreasing the emission of other pollutants.

The potential health effects of noise pollution are numerous, pervasive, persistent, and medically and socially, significant (Singh & Pandey, 2013). Besides, noise can produces direct and cumulative effects that will impair health and degrade residential, social, working, and learning environments with corresponding real (economic) and intangible (well-being) losses (Singh & Pandey, 2013). It interferes with sleep, concentration, communication, recreation, vegetation, animals and birds. Though noise pollution is a slow and subtle killer, yet very little efforts have been made to ameliorate the same. It is, along with other types of pollution has become a hazard to quality of life (Singh & Pandey, 2013).

2.4 Sources of Noise Pollution

Possibly there are several sources of noise pollution (Table 2.3) that can be generated around the institutional area like transportation, occupation and also from neighbors (WHO, 2002). Noise is a prominent feature of the modern environment including noise from industry and big machines working at a very high speed and high intensity (Stansfeld & Matheson, 2016). Noise intrusion, which come from outside the school, but seems to be increased more by noise from other parts of the school leaking into the classroom. (Woolner & Hall, 2010) and it is the principle source of creating noise (Latif *et al.*, 2014).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Table 2.3: Sources of Noise

Outdoor Sources	Indoor Sources
1. Transport -Aircraft -Road -Rail 2. Occupational -Machinery 3. Neighbors -Machinery -Loud music	1. Ambient noise outside 2. Building design and location 3. Room acoustics 4. Activities of occupants 5. Children

(Source: WHO, 2002)

Next, based on observation, there is background noise from within the room, often due to heating and ventilation systems but also caused by equipment such as projectors and computers (Woolner & Hall, 2010). Electronics devices also give major contribution in noise pollution as they keep ringing; vibrating which then may increase the noise level.

Finally there is the noise generated by students engaged in learning, which, unsurprisingly, varies according to the nature of the activity (Woolner & Hall, 2010). As for example, when students are having a group discussion they tend to speaks freely instead of having a slow conversation or whispering among themselves. These problems automatically are categorized as one of the sources which lead to the increasing of noise level.

2.5 Indoor Noise Pollution and Disturbance

It is well known that good indoor environmental quality is essential, in particular for work, study or convalescence (De Giuli *et al.*, 2013). Indoor noise pollution must be concerned by each people as to improve the environment and facilitate better learning

(Woolner & Hall, 2010). This is because, noise is also one of the ubiquitous environmental pollutants, mostly generated by traffic in urban areas (Moudon, 2009).

To add on, indoor noise pollution is affected by outdoor noise and indoor sources such as TV, radios and music which the level is modified by building design and location as well as room acoustics (WHO, 2002).

Noise in libraries is a constant source of concern for library users and administrators (Lange *et al.*, 2015). This is a matter to concern as library itself is also an important space to an equal number of users who want any noisy activity banned (Bell, 2008). Exposure to high level of noise may cause severe stress on the auditory and nervous system of the urban dwellers, particularly the children (Latif *et al.*, 2014) and also students as it will affect students learning ability.

2.6 Impact of Noise Pollution

The relationship between noise pollution and human health has been the subject of numerous studies over the last two decades (Pujol *et al.*, 2014). High level of noise has been identified as having negative impacts within working environment especially to recipient within the sources where the noise is generated (Obot & Ibanga, 2013).

Moreover, measuring noise levels is to ascertain the actual level whether it conformed to an acceptable sound level which the human ears can tolerate. Noise becomes an unjustifiable interferences and imposition upon human health, comfort and quality of human life (Obot & Ibanga, 2013). The potential health effects of noise pollution ranging from psychological to physiological (Figure 2.2) such as sleep disturbance, reduced working efficiency, auditory damage, speech interference, increase

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

in blood pressure, fatigue etc. The effects of noise are temporary and are seldom catastrophic but adverse effects that impair health can be cumulative with prolonged or repeated exposure (Tripathi *et al.*, 2014).

Previous study has made a research that there has been a great deal of research in the past 30 years into the effects of noise on children's learning and performance at school (Shield & Dockrell, 2003). The study also includes the effects of chronic exposure to different kinds of environmental noise and of other kinds of classroom noise. Many of these studies have examined the effects of noise on children's cognitive processing in a range of tasks and on their academic performance at school (Shield & Dockrell, 2003).

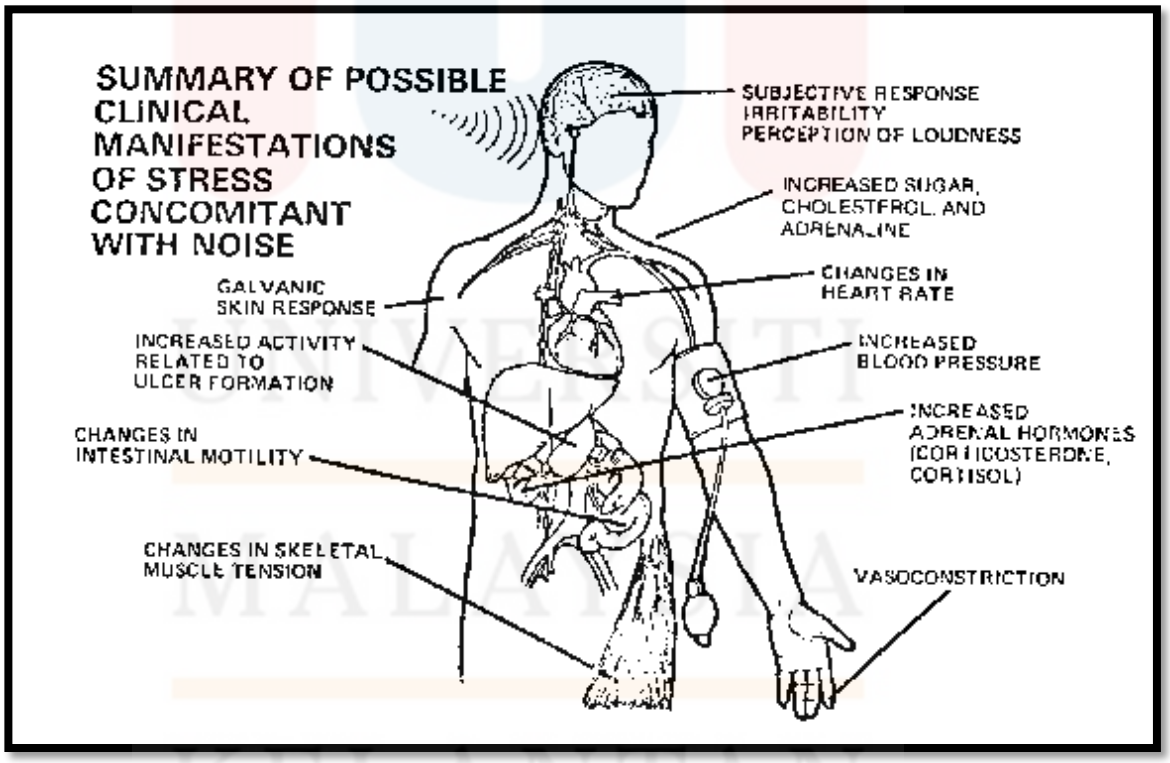


Figure 2.2: Physiological Effects of Noise (WHO, 2002).

It is important to note that the levels of noise exposures associated with these health effects range widely, hence to prevent the adverse health effects, different exposure limits and metrics need to be specified (Hammer *et al.*, 2014). Despite knowing that noise is part of our everyday lives, not only for those people who live in great urban centers and that are becoming more and more patient with the sounds, we must deal with these sounds when they occur together with learning situations, where all subject's energy should be directed the studies, during the hard task of listening, saving and learning regardless of the (Dreossi & Momensohn-Santos, 2005).

2.6.1 Long-term effects

No sound insulation has been provided to protect the children from intrusive external noise (Akhtar *et al.*, 2011). Noise exposure could also produce many extra-auditory effects, as respiratory disease (asthma, bronchitis), cardiovascular disease, hormonal responses (stress hormones), weakening of the immune system, sleep disturbance, psychiatric diseases, depression, aggression, annoyance, cognitive impairment, interference with verbal communication, frustration and social isolation (González, 2014).

2.6.2 Students Learning Ability

Students learning abilities also be affected because students might get bad grades as their study environment is polluted with noise. The environment is not conducive for them to concentrate on what they are studying. Impact of noise on student's reading and learning ability, and speech intelligibility will be affected as well (Akhtar *et al.*, 2011). Also, the examination of the effects of noise on children's performance, a limited

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

number of surveys have investigated the annoyance experienced by children in relation to their noise exposure at school (Shield & Dockrell, 2003). Noise tends to undermine long term learning, corroborating the findings of the observational studies of chronic environmental noise (Woolner & Hall, 2010).

Moreover, it is proven that noisy conditions have direct negative effects on learning, particularly language and reading development, as well as causing indirect problems to learners through distracting or annoying them (Woolner & Hall, 2010). Exposure to extremely high levels can cause the damage to occur instantly, while, with constant sound levels, noise based injury increases with the increasing of the exposure time (Guarnaccia *et al.*, 2014).

Studies have found associations between noisy environments and reading problems, deficiencies in pre-reading skills and more general cognitive deficits (Woolner & Hall, 2010). The environmental noise may be contributing to developmental problems, particularly with speech and language and with reading (Akhtar *et al.*, 2011). This is happening because the students are struggling with the noise generated within the study area itself. Reduced noise levels may improve hearing, understanding, and communication as well as the stress hormone levels, which then can lead to improved quality of life (Gerhardsson & Nilsson, 2013).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

2.6.3 Auditory and non-auditory effects

Exposure to noise can be the cause for several humans diseases which including both auditory and non-auditory affects acoustic noise on human health (Guarnaccia *et al.*, 2014). Auditory effects refer to noise induced hearing loss (Reenen, 2015).

Non-auditory effects refer to the physiological and psychological impact that noise has on the hearer (Reenen, 2015). Noise affects not only the hearing apparatus, but it is generally experienced that it disturbs human activities and communication, causing annoyance (Guarnaccia *et al.*, 2014). Noise levels are argued to be exacerbated by high levels of reverberation, since this can increase the noise level itself and make the hearing of speech more difficult (Woolner & Hall, 2010) which then cause hearing impairment (Akhtar *et al.*, 2011).

In a study by Guarnaccia *et al.* (2014), it was found that the auditory effects problem has been evidenced that with a continuous exposure to noise of 85 to 90 dB(A), particularly over a lifetime in industrial settings, can lead to a progressive loss of hearing, with an increase in the threshold of hearing sensitivity.

The following graph (Figure 2.3) shows that human can tolerate up 80 dB(A) of noise. If exceed the sound level, it can cause damage to human hearing which including acoustic trauma, tinnitus, temporary hearing loss and permanent hearing loss.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

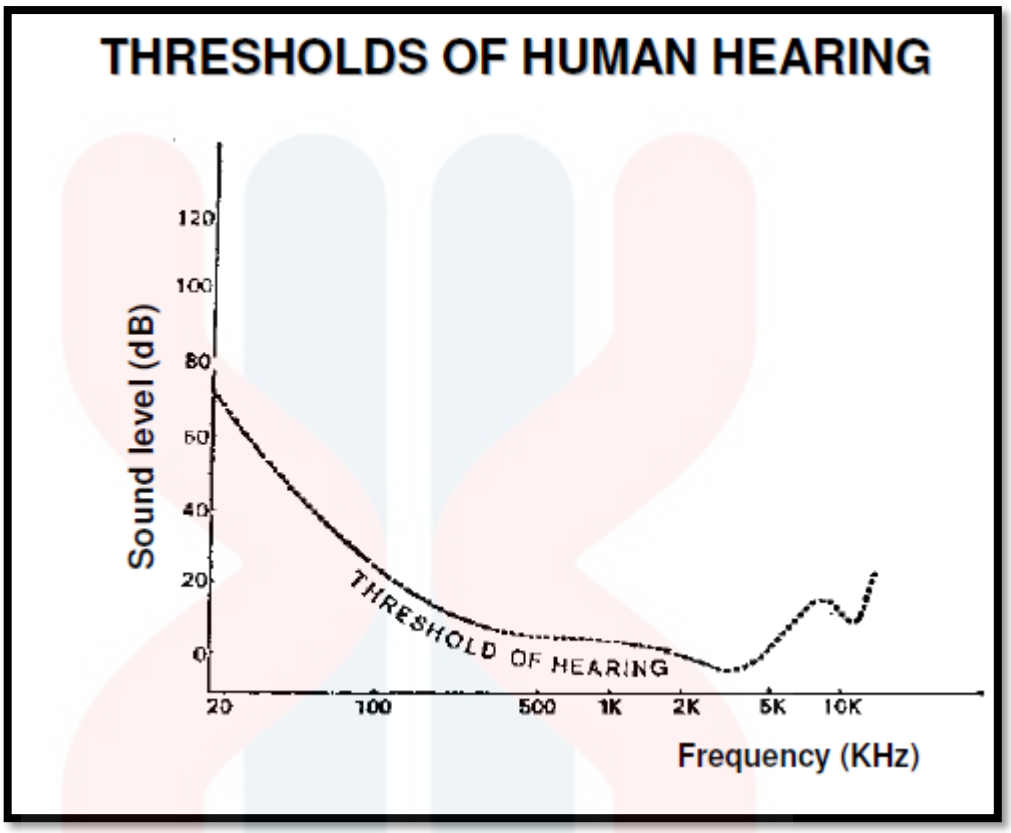


Figure 2.3: Thresholds of Human Hearing (WHO, 2002).

The temporary hearing loss occurs immediately after exposure to a high level of noise while permanent hearing loss growths in time, if noise exposure is not interrupted or when protection equipment are adopted (Guarnaccia *et al.*, 2014). For example, students tend to wear headphones in the library and for sure the volumes are high. This is one way that contributes to deafness as much as the construction sites contributed.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Several students are having difficulty in performing cognitive tasks when it is noisy which they cannot adapt themselves in such situations. Excessive noise and reverberation interfere with speech intelligibility, resulting in reduced understanding and therefore reduced learning, whereby the noise is defined as combination of noise coming from outside school and generated inside classrooms due to crowding, equipment and other source (Akhtar *et al.*, 2011).

FYP FSB

UNIVERSITI
MALAYSIA
KELANTAN

FYP FSB

CHAPTER 3

MATERIALS AND METHODS

3.1 Study area

Universiti Malaysia Kelantan (UMK) has a total of three campuses which located in Jeli, Pengkalan Chepa and Bachok, Kelantan. The statistical data of the students' population in 2015/2016 session were 884 (UMK Pengkalan Chepa), 456 (UMK Bachok) and 442 (UMK Jeli), respectively. A total of 1782 students' enrolment in 2015/2016, 2628 students in 2014/2015 session and a total of 1800 in 2013/2014 session. The coordinate for both locations was taken by using the GPS in order to locate the study area.

Figure below (Figure 3.1) showed the map of the study area which locate in the UMK Jeli. The coordinate point for UMK Jeli library was (5.745468, 101.8638) with 904 m^2 area.

Figure 3.1: Map of Universiti Malaysia Kelantan Campus Jeli

Inside the UMK Jeli Campus, there are two faculties altogether, which were Faculty of Earth Science and Faculty of Agro Industry. All students from both faculties share the same administration building in the campus. The administration building for student welfare was located between two girls hostel.

Figure below (Figure 3.2) showed the map of the study area which locate in the UMK Pengkalan Chepa. The coordinate point for UMK Pengkalan Chepa library was (6.164262, 102.283640) with 859 m^2 area.

Figure 3.2: Map of Universiti Malaysia Kelantan Campus Pengkalan Chepa

While in the UMK Pengkalan Chepa Campus there was one faculty which was Faculty of Entrepreneur and Business. It was the main campus which operates all three campus altogether. UMK Pengkalan Chepa campus was located in Taman Bendahara, Kota Bharu, Kelantan. The campus was located near the city of a row of stores which sells food shop, sell beauty products, and others. Pengkalan Chepa Campus also located

close to the Kota Bharu Mall and close to MacDonald. UMK provides facilities for students such as clinics, recreation places such as futsal court, badminton and netball court. In addition UMK also provides a library and a computer lab, ICT to help students get good facilities and comfortable study area when learning.

3.2 Materials

The materials used to conduct the experiment were Geographical Point System (GPS) (Figure 3.3) and the noise monitoring device (Figure 3.4) , TENMARS TM 102 sound level meter auto ranging.

Figure 3.3: Geographical point system (GPS)

GPS was used to fix points from which to determine the position. The satellites transmit coded radio signals which were picked up by GPS receivers. When a GPS receiver locks onto the nearest satellite, it determines how long it takes for the coded signal to reach it. Using this figure, the GPS calculates its physical distance from the satellite. With a distance reading from at least three satellites, a GPS unit can pinpoint its current position on the earth (National Geographic, 2002).

Figure 3.4: Sound level Meter (TENMARS TM 102 sound level meter auto ranging).

The noise monitoring device was held in a correct way to get the accurate reading of noise decibels. Tripod was used for a compliance inspection or to take enforcement action. To obtain the most accurate data using this method, the microphone pointed towards the source of the noise, to minimize sound reflecting off your body (Department of Environment and Heritage Protection). Figure 3.5 below showed the correct way on how to handle the noise monitoring device in order to get an accurate reading.

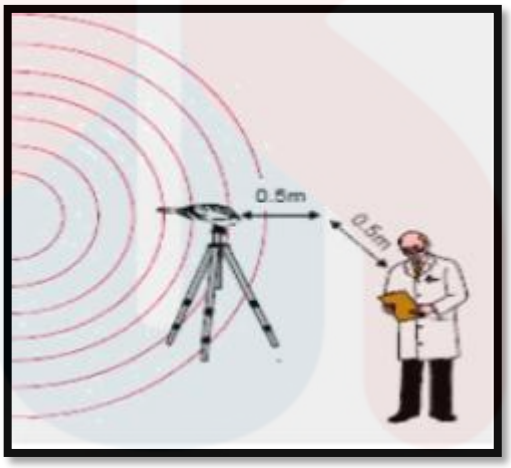


Figure 3.5: Sound level meter mounted on tripod (Kjaer, 2000).

According to the Department of Environment and Heritage Protection, a noise reading should always be taken at the height of the receptor. If the receptor is at the ground level, take a measurement at the ground level in between 1.2 to 1.5m off the ground as referred to the below figure (Figure 3.6).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

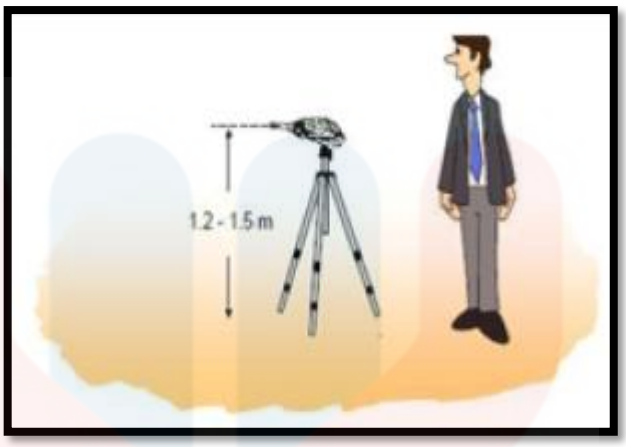


Figure 3.6: Sound level meter mounted on tripod (Kjaer, 2000).

Next, mounted on a tripod was the method used most commonly and it was the standard methodology for most noise measurements where compliance or enforcement action may be taken as a result of the investigation. Care should be taken not to make noises whilst observing the meter in this method and ensuring the least amount of reflective surface from your body is exposed to the meter.

3.3 Methods of data collection

In this experiment, the data was collected for about three months to acquire a full set data. In a month, one day in a week was chosen for data collection in the library. The days consist from weekdays and working days. The days were including holidays and academic session. Sound levels were recorded at one fixed location in each library. The tripod was placed at the students learning area where the students came in and out from both libraries. The data were recorded for three days in a month at each station.

The data was collected in the morning, evening and night. For the first phase, the data sampling has been carried out at about 9.00 am until 11.00 am. Meanwhile, the

second phase at about 2.00 pm until 4.00 pm and the third phase from 8.00 pm until 10.00 pm. The readings were taken for 2 hours in each place at 5 minutes interval. So, there will be 25 readings in each day and the average value is recorded.

According to Planning Guidelines for Environmental Noise and Limits Control (2007), for compliance verification and record keeping, the sampling period should be continuous to cover the entire twenty four hour day cycle to obtain the respective day time, evening and night time noise levels.

As said in the Planning Guidelines for Environmental Noise and Limits Control (2007), the measurement shall be made with a precision sound level meter which complies with the requirements. Measurements shall be made outdoors at 1.2 to 1.5 m above the ground and, practical, at least 3.5m from walls, buildings or other sound reflecting structures. When circumstances dictate, measurements may be made at greater heights and closer to the wall (for example 0.5 m in front of an open window) and these special conditions indicated in the measurement records.

The sampling methods of noise monitoring study were further divided into three broad methods which are continuous day night sampling, regular sampling repeated over an hourly basis and single sample. As mentioned above, this study used the regular sampling repeated over an hourly basis. This procedure involved the continuous sampling of instantaneous sound pressure level over a designated duration (for example 5 to 20 minutes) for two hours' time. This procedure in essence limits data sampling over a shorter period of time per hour, thereby permitting measurements to be undertaken at more positions.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

As mention in the Planning Guidelines for Environmental Noise and Limits Control (2007), Annex B of DOE (2007), it was clearly stated the sampling techniques used in the studies. By referring to the estimation of daily LAeq according to sampling technique Part 1: 1984, a modification techniques was done in completing the data collection. The modified sampling technique that was used in completing the data analysis is that 5 minutes interval for two hours' time.

Table 3.1 below showed the maximum permissible sound level (laeq) by receiving land use for planning and new development which the study area must be follow the standard stated.

Table 3.1: Maximum Permissible Sound Level (Laeq) By Receiving Land Use for Planning and New Development (DOE, 2007)

Receiving Land	Day(dB(A))	Night(dB(A))
Noise Sensitive Area	50	40
Suburban Residential (Medium Density)	55	45
Urban Residential (High Density)	60	50
Commercial Business	65	55
Designated Industrial	70	60

(Source: Schedule 1 of DOE (2007): Maximum Permissible Sound Level (Leq) By Receiving Land Use For Planning and New Development).

Table above (Table 3.1) mentioned about the maximum permissible sound level that receiver land should follow. In this study, a library is chosen and library was classified as the noise sensitive area because library itself was one of the institutional place for students to get own privacy during learning and revising. The maximum sound level in the day should be 50 dB(A) while 40 dB(A) in the night time.

3.4 Data collection

The data collected in this study was calculated and tabulated. As mentioned above, data were collected in three months to get the average data value between both libraries respectively. A simple calculation was done to get the average value.

Average or mean is described as the sum of all of the numbers in a list divided by the number of items in that list. The formula used in calculating the average value between two libraries is as below:

$$A = \frac{S}{N} \qquad \text{... (Equation 3.1)}$$

Where;

A: average

S: the number of terms

N: total numbers in the set

3.5 Statistical Analysis

To find the differences in average value between both libraries in the campus, a non-parametric test which is the Kruskal-walis test was used. The non-parameter was described as the distribution free tests as the test itself does not require any assumption or hypothesis. The Kruskal-wallis test in this study was used as the assumptions of ANOVA between the variables were not met.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Result Analysis

The noise level was measured at two out of three libraries in UMK's campuses, which were UMKPC and UMKKJ. The library itself represents as sensitive area where people seeks for "books", "knowledge" and also represents as information sources in UMK. Equivalent Continuous Noise Level (Leq) was measured inside both libraries to get the monthly average. This was done to analyze and study the noise level whether it followed the scope stated by World Health Organization (WHO).

Based on the results obtained throughout three months of data collection on Equivalent Continuous Noise Level (Leq), the study showed that the data obtained was all exceeding the standard value stated by WHO, 1999. According to WHO, the noise level recorded during daytime should be below than 50 dB(A) and 40 dB(A) at night time.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

4.1.1 Data sampling in May

Figure below (Figure 4.1) showed the data recorded in May for both libraries in the UMK campus in all data phases.

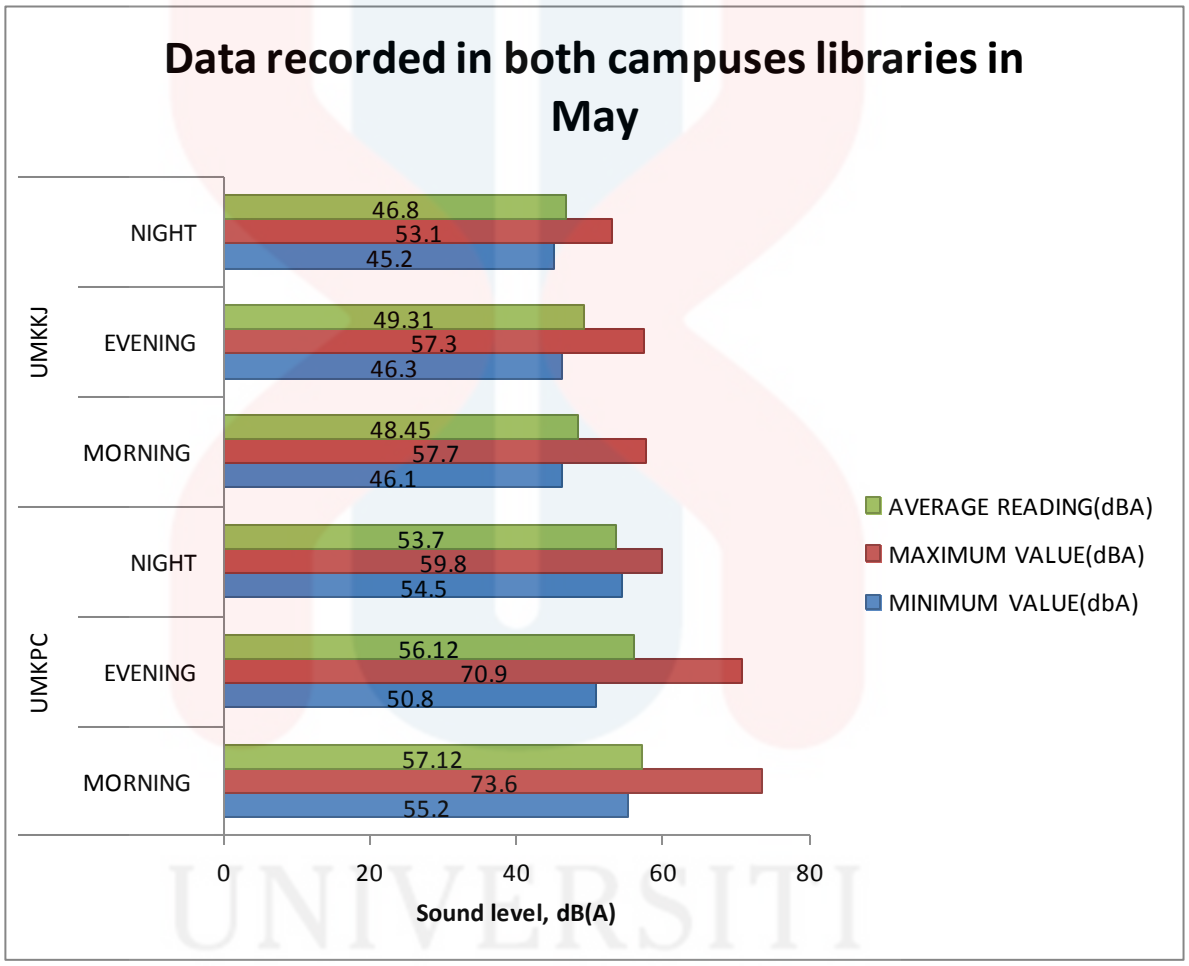


Figure 4.1: Data recorded in May for both libraries

As shown in Figure 4.1 above the higher average level of noise in Universiti Malaysia Kelantan Kampus Jeli (UMKKJ) was during evening time,49.31 dB(A) followed by morning and night time which was 48.45 dB(A) and 46.8 dB(A) respectively. The reading for the whole day in both campuses was completely rose during morning time which was from 9 -11 am was probably due to the students who

came early in the morning to secure them a place to study. Also, students found it was effective to have a group discussion in the meaning time which was morning as they might have others activity to be done in the evening.

The highest level of noise recorded in Universiti Malaysia Kelantan Kampus Pengkalan Chepa (UMKPC) was during morning time (9 -11 am), which was 73.6 dB(A). It was probably due to maximum student usage as the students populations in UMKPC was higher (refer Table 4.1) than UMKKJ and it was found out that the area of UMKPC was small compared to UMKKJ. To be exact, the library area for UMKKJ was 904 m^2 while UMKPC was 859 m^2. This area comparison clearly supported the data collected in both libraries in May. The area inside the UMKPC library itself possibly leads to the increasing in the sound level. Based on observation, the sound was spreading all over in both libraries as the walls were not sound absorbant. So the sounds made by students are reflecting to the wall thus lead to the increasing rephrase sound level. So with small space provided, the noise itself was echoing thus increasing the noise level. The increasing noise level inside the library might disturb the students who need to focus themselves in studying. During data collection was done, it was quite annoying as students are too loud discussing on their projects without considering others.

Also, the audio, system and devices are one of the factors contributing to the noise pollution. The sound might come from the television which was always on as well as the gadget and technologies used by the students and staff in the library. For instance, the sound were coming from the keyboard as students tend to spent their time playing games inside the library and some were forgot to put their mobile phone in silent mode.

Previous study found that some students were beginning to ask for places in the library without the distraction of computer keyboards, printer sounds, and cell phones (Bennett *et al.*, 2005).

All students own a mobile phone and are a must to bring it anywhere as it was more capable and common including library. The students that we serve in higher education often own a variety of mobile devices, including laptop computers, cell phones, and MP3 players or other audio player devices (Lippincott, 2010). This is as true as students also went to library to get a free internet access as many students do not use the internet capabilities of their devices at present, primarily due to cost considerations. One important recent finding indicates that library services as one of the top three institutional services they would most likely use from a smart phone (Smith *et al.*, 2010). Walton in his study also discussed that mobile phones should be restricted from the library area as it become too noisy when they wish to use it for study purposes. Environment inside the library was polluted hence it became crucial to memorize all those fact thus it might affect students learning ability which has been discussed in Chapter 2.

Moreover, faculty and staff come to the library to browse the new books and journals, and college staff members frequently spend part of their lunch breaks reading in the library (Bennett *et al.*, 2005). These matters should be put into consideration as to manage the indoor noise pollution. Librarian should played their roles to control the level of noisiness inside the library itself as it was mentioned in the previous study which stated that relationship between faculty-librarian collaboration and student

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

learning, found that the quantity of librarian engagement was a clear correlate to the quality of student learning (Douglas & Rabinowitz, 2016).

Referring to Figure 4.1 above, the maximum sound level recorded in UMKKJ during morning time was 57.7 dB(A) which was lesser than UMKPC, 73.6 dB(A). While the minimum value recorded in UMKKJ was 46.1 dB(A) compared to UMKPC which was 55.2 dB(A). During evening time, the maximum sound level recorded was 70.9 dB(A) in UMKPC which was higher than UMKKJ, 57.3 dB(A). As for the minimum value, UMKKJ recorded 46.3 dB(A) while UMKPC was 50.8 dB(A). At night time, the maximum sound level recorded was 59.8 dB(A) in UMKPC which slightly higher than UMKKJ, 53.1 dB(A). The minimum sound level recorded in UMKKJ was 46.8 dB(A) in the night time while 53.7 dB(A) in UMKPC.

For the whole data collected in May, it was apparent that the daily average sound level recorded for the whole day in UMKPC was far higher compared to UMKKJ. The overall average sound level during daytime in UMKKJ was suitable for human hearing as the sound recorded was below than 50 dB(A) and approved by WHO. In UMKPC, the overall average sound level was exceeding the standard stated by WHO which supposed to be below than 50 dB(A). For night time, both libraries are exceeding the standard which was supposed to be 40 dB(A).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

4.1.2 Data sampling in June

Figure below (Figure 4.2) showed the data recorded in June for both libraries in the UMK campus in all data phases.

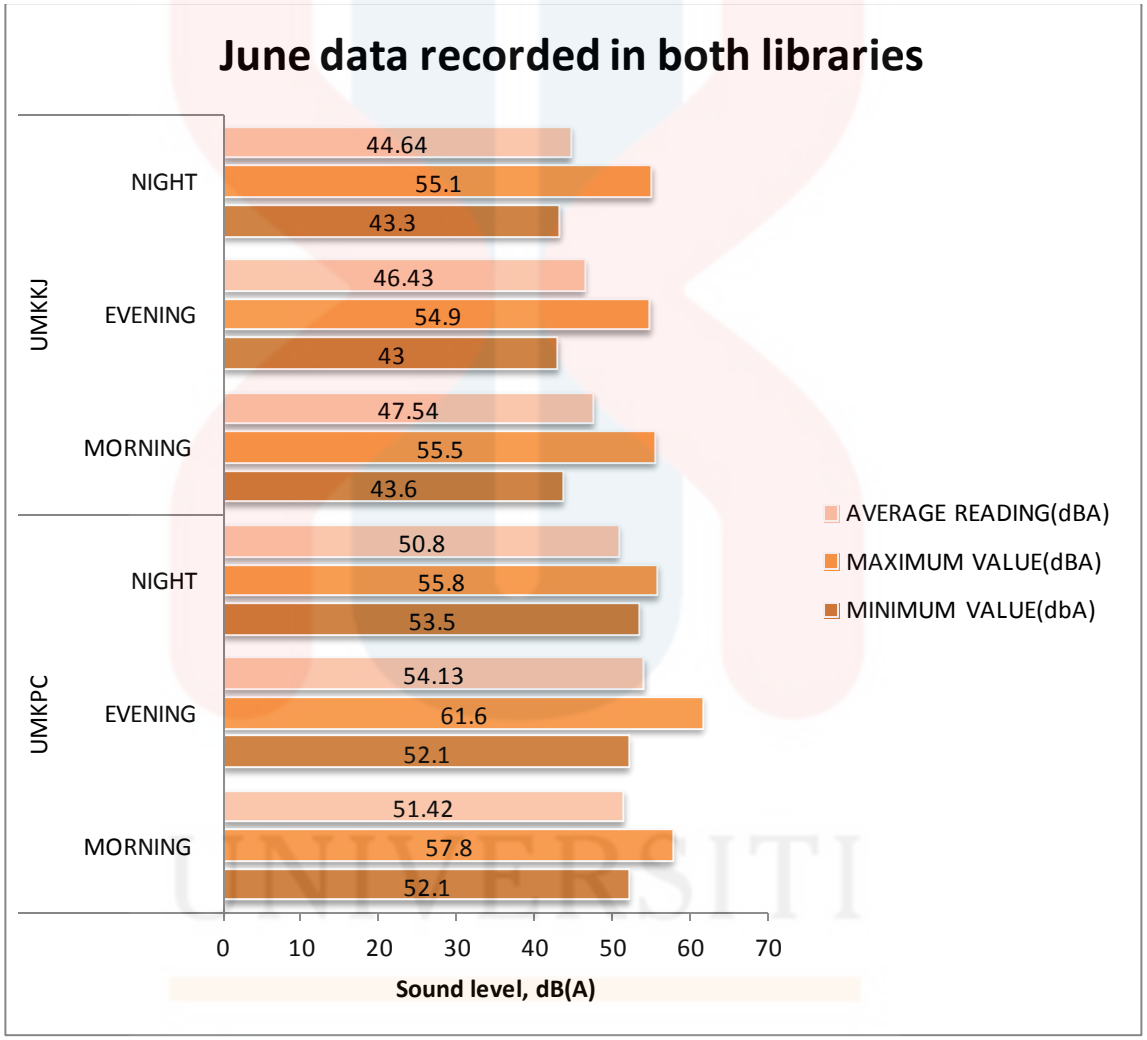


Figure 4.2: Data recorded in June for both libraries

From Figure 4.2 above, the maximum sound level recorded was 55.5 dB(A) which was in the morning while the minimum sound level in the evening was 43.0 dB(A). Above all, the average data recorded for the whole day in UMKKJ exceeded the level stated by WHO. Data was taken during the examination weeks, thus it seems to

coop well with the situation where the library condition should be a lot quieter than normal months. From the extracted data, it clearly shown that for both morning and evening the reading was below than 50 dB(A) which able the students to study comfortably for their upcoming examination. During the night time, the average data recorded was 44.64 dB(A) which a bit higher than the expected level, 40 dB(A). So, some students might found it bothersome to study during the night in the library.

Also, it showed that in UMKPC (Figure 4.2) higher sound levels were recorded compared to UMKKJ. All the data recorded exceeded 50 dB(A). The highest maximum sound level recorded was 57.8 dB(A) in the morning and increase rapidly to 61.6 dB(A) in the evening followed by night which recorded 55.8 dB(A). The average readings for the whole day were exceeding the standard by WHO and some factors might be affecting the data recorded too. Some of the factors might be coming from inside the library itself such as the sound coming from the air conditioning as the library ceiling closer to the tables provided compared to UMKKJ. In UMKPC library, ventilation system was one of the reasons why the levels keep increasing rapidly as it could be a nuisance to students. Ventilation is the supply and removal of air from a building (Clark & Siddall, 2013) which ventilation system keeps the condition inside the library cool and students found it refreshing too (Akay & Onder, 2015).

Figure 4.2 was leading with the highest value of sound level recorded for the whole day in UMKPC as compared to UMKKJ. As mentioned before, the average value during the day time in UMKPC was slightly increased same with the night time recorded with the suggested level, 50 dB(A). Needless to mention that the sound level recorded in UMKPC was highest while for UMKKJ it was lowered towards standard value due to

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

students' activities and behavior. There are two main directions for research in behaviors which was research of individual information behavior, and research on the patterns of usage of resources (Rubinić, 2012). This study (Rubinić, 2012) has divided individual information behavior into three subgroups which further classified into:

- Studies of information seeking and searching.
- Studies that examine disciplinary differences in information seeking and usage.
- Studies that look at information behavior in a wider context that often includes learning and teaching.

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

4.1.3 Data sampling in July

Figure below (Figure 4.3) showed the data recorded in July for both libraries in the UMK campus in all data phases.

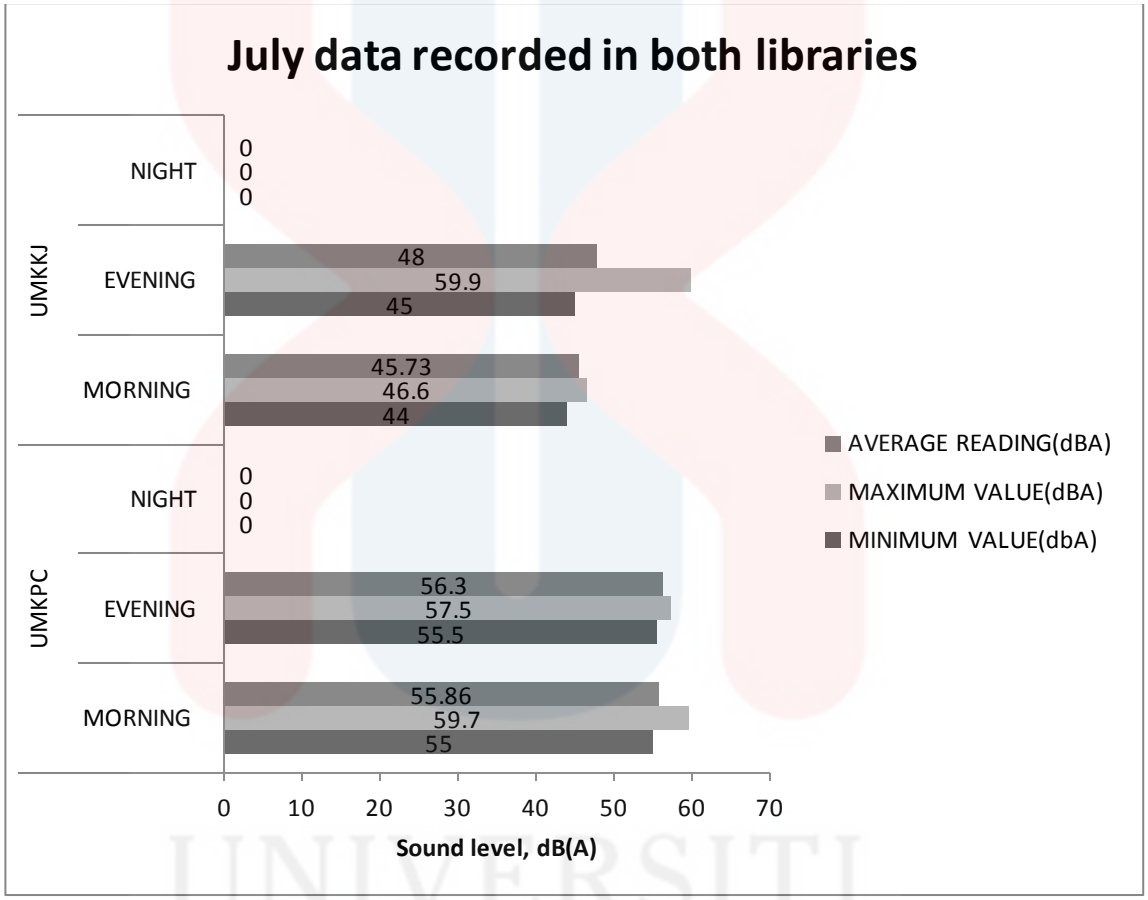


Figure 4.3: Data recorded in July for both libraries

From Figure 4.3 above, the highest graph indicates the highest sound level recorded in UMKKJ which was recorded in the evening, 59.9 dB(A). The minimum level of sound recorded was in the morning which both minimum and maximum level recorded was below than 50 dB(A) (45.73 dB(A) and 46.6 dB(A) respectively). The result for this month was totally within the limit suggested by WHO and the average

data recorded during morning time was 45.73 dB(A). There was no data recorded during night time as the library did not operate during semester break.

Different from UMKKJ data recorded, Figure 4.3 showed that the data for both morning and evening were exceeding the standard stated by WHO. The data showed an increasing trend in UMKPC as the data recorded keep increasing time by time. The library was also not operates during night time but in the daytime, the staff who was working tend to speak louder and freely among their colleagues as there was no students during the semester break.

As mentioned earlier, the data recorded for UMKKJ in the morning was following the WHO guidelines which the sound level recorded was below 50 dB(A). Different to UMKPC, the morning data was higher than 50 dB(A) as shown in the figure (Figure 4.3). From the comparison, the most suitable places in doing revision were in UMKKJ as the sound exposed cannot harm the students and it will not affecting the students' performances.

Also, information extraction during revision is beneficial for long-term memory (Hays *et al.*, 2012). As shown above (Figure 4.3), no data was taken during night time. Data recorded in UMKKJ was filled with students as there were student who were doing their short semester but still able to keep the sound level below 50 dB(A) compared to UMKPC.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Besides that, UMKKJ library was near the construction sites but still able to keep the sound level. So, the noises from the dwelling, machinery were one of the factors affecting the increasing of noise level. The noise level might be decreasing as the construction sites was fully completed turn into a new hall. Different equipments were used in constructions site including piling, brick breaking and all. Noise from Industrial Plants and Mechanized industry creates serious noise problems, subjecting a significant fraction of the working population to potentially harmful sound pressure levels of noise (Akay & Onder, 2015)

FYP FSB

UNIVERSITI
MALAYSIA
KELANTAN

4.1.4 Comparison of Average Sound Level in UMK Libraries with WHO during daytime

Figure below (Figure 4.4) showed the average sound level for both libraries in the UMK campus in day time being compare with WHO standard.

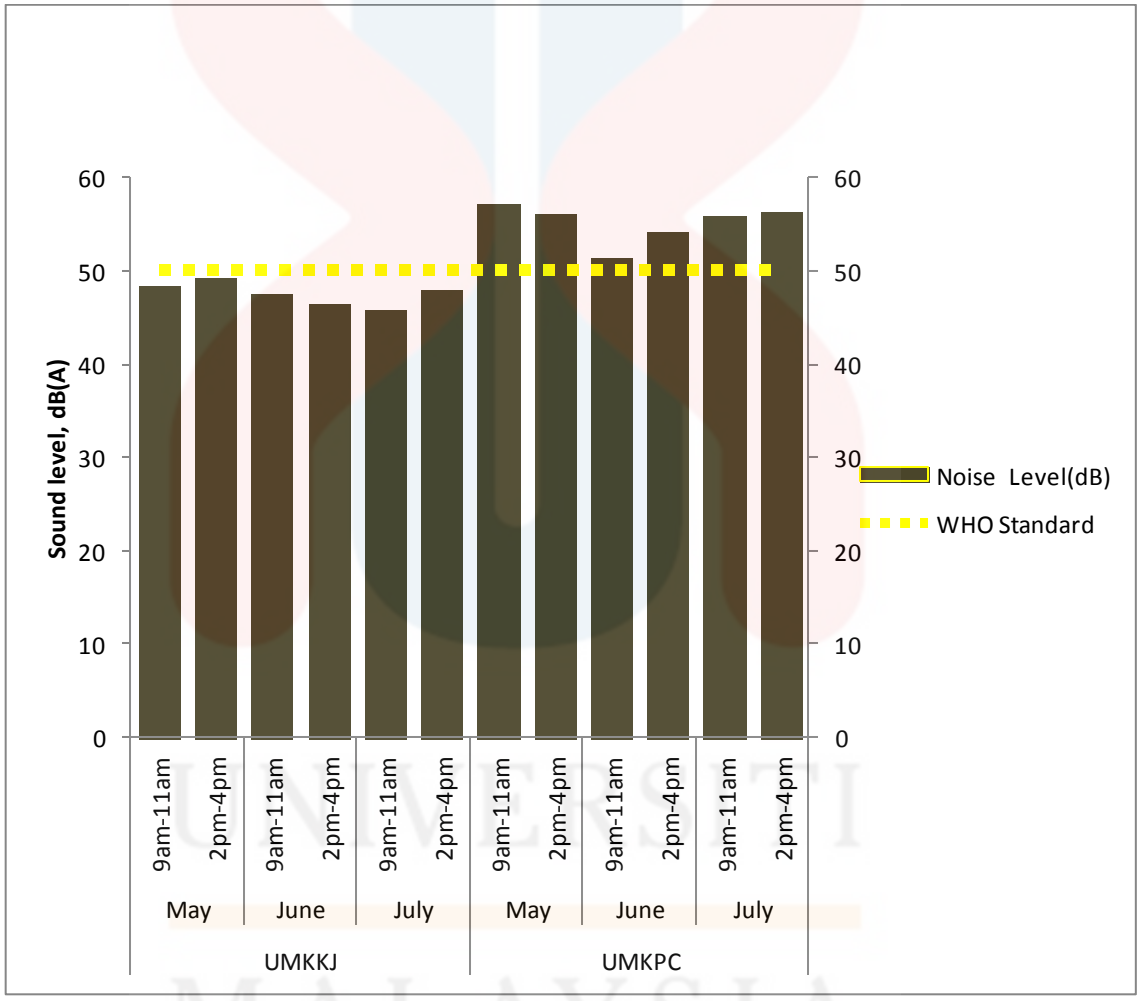


Figure 4.4: Comparison of average sound level in both libraries with WHO during daytime

Figure 4.4 indicates the average sound level found in both libraries during daytime being compared with WHO level. In May data recorded, the sound level recorded was less than 50 dB(A) while in UMKPC the sound level was higher than 50 dB(A) (57.12 dB(A) and 56.12 dB(A) collectively). So, with the comparison made, UMKPC might cause problem in human hearing, emotional damaging, and headache or even worse may cause deafness in any mean. While in UMKKJ, the sound level was below the WHO line which the sound exposed are able for human ear to tolerate. Students also found it effective to stay longer in the library.

The results stated varied as the sound level keeps increasing and at the same time decreasing to in line with the level fixed by WHO. To add on, the students' population might affect the sound level in each library. To be exact, the higher the number of students, the louder the noise produced. This was because the student's population in UMKPC was 2637 while in UMKKJ was 5204 (refer Table 4.1). It clearly stated in the results as UMKPC was always placed first in exceeding the level stated by WHO.

Table 4.1: Students populations in both campuses

Library	No. of Students
UMKPC	2637
UMKKJ	5204

(Source: Administration and Academic Department, Universiti Malaysia Kelantan (2016) & www.umk.edu.my)

During data recording sessions in June, students in both campuses had their examination week. So as expected, most of the students visited the library to do revision. Even though a lot of students visited the library, UMKKJ still can avoid the noise pollution. Figure 4.4 above clearly showed that both morning, 47.54 dB(A) and evening 46.43 dB(A) sound level recorded were less than 50 dB(A) while in UMKPC the sound levels recorded were 51.42 dB9A) and 54.13 dB(A) respectively. The average sound levels in the morning and evening were 51.42 dB(A) and 54.13 dB(A) greater than the suggested value, 50 dB(A). During data was taken in UMKPC, it was quite uneasy to concentrate yet memorizing facts as the condition and situation there was too loud. Recent studies had proved that the literature on human learning and memory is rife with phenomena that have stubbornly refused to yield their secrets to psychological science (Butler, 2010). It is proven as (Walton, 2006) stated that students need more study space during exam period as library is packed and nowhere for all who want to come into the library to study and perceived increased noise levels .

Supposedly, UMKPC should have a bigger library as they have larger students populations (refer Table 4.1) as compared to UMKKJ. UMKPC authority should build a bigger and comfortable library to fill their students' capacity and at the same time students are not fighting over a place in the library.

Things were different in UMKKJ campuses where students are free to choose their tables without worries whether to sit in the partitioned tables or not. UMKPC got no partitioned tables in their library. This reasons was clearly mentioned in the previous study where these selection reasons included the availability of partitioned versus non-partitioned study tables (Schaeffer & Patterson, 2013). Reasons for selecting seating

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

locations within the library differed as a function (Schaeffer & Patterson, 2013) of whether the students were on the centre or side of the library even at the back side of the library where there is TV. Still, UMKKJ library keep their sound level in line with WHO level. The difference between the carrel and the study is usually a matter of size, but both include at the very least a desk, a chair, and a place for books (Engel & Antell, 2004).

The next factors of noise observed in UMK was the space (Figure 4.5 and Figure 4.6) provided. This is a resource that has to be managed, developed and altered to reflect the changes happening in higher education (Walton, 2006). Library should have study zoning to keep the students who are visiting comfortable. Students often spend many hours within the library and therefore need a place that is welcoming, comfortable, and can meet their many needs as they arise (Applegate, 2009). There were students who not only came to study but also there were students who need to fill their leisure time at the libraries. As mentioned by (Cunningham & Tabur, 2012), even though students are not using the print collection, they still choose to go to the library for academic pursuits and they will go if a library is a desirable place as they visits. (Acker & Miller, 2005) also described the value of learning spaces for contemporary students as how effectively and efficiently the space provides access to learning resources which also including other students, access to information technologies and web content that support efficient learning.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Despite the massive impact of ICT on library service provision, academic libraries continue to supply patrons not only with collections but also spaces (Bryant *et al.*, 2009; McDonald, 2010; Carpenter *et al*, 2011; Latimer, 2011). Below (Figure 4.5 and Figure 4.6) was the library floor plan which clearly differentiates the area, furniture and layout in both libraries. As shown below, it was clearly showed that why the sound levels kept exceeding the WHO standard which was due to the compacted area as well as the way the furniture was placed as compared to UMKKJ.

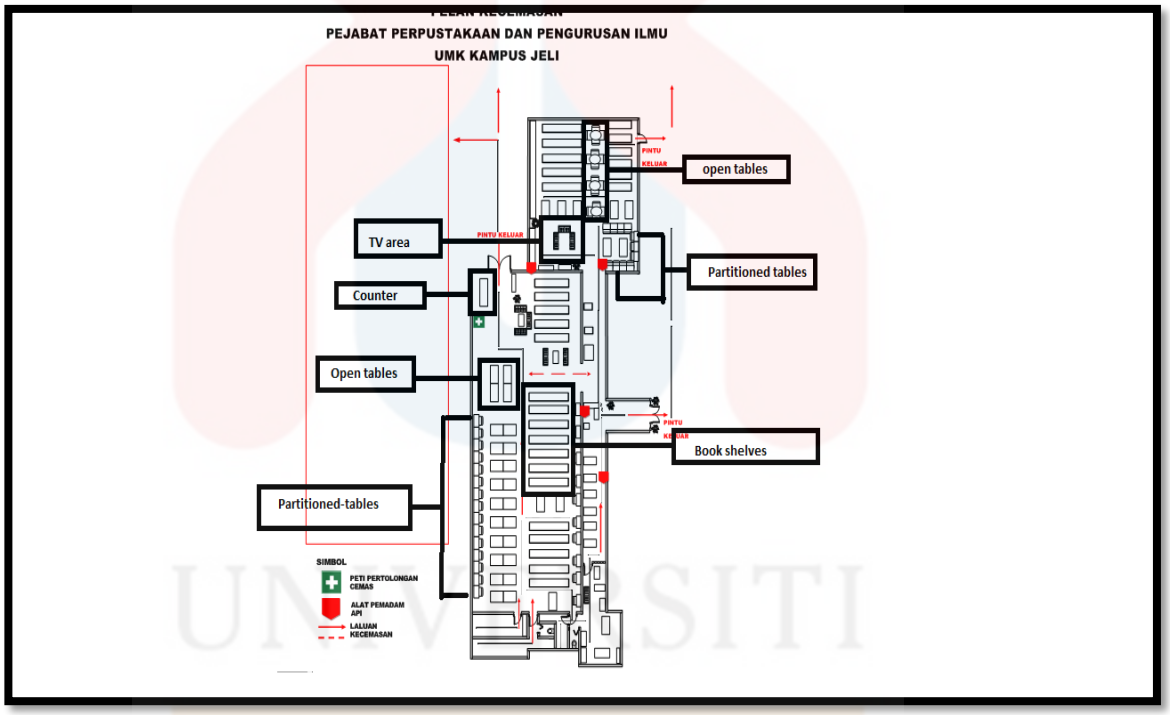


Figure 4.5: UMKKJ library floor plan

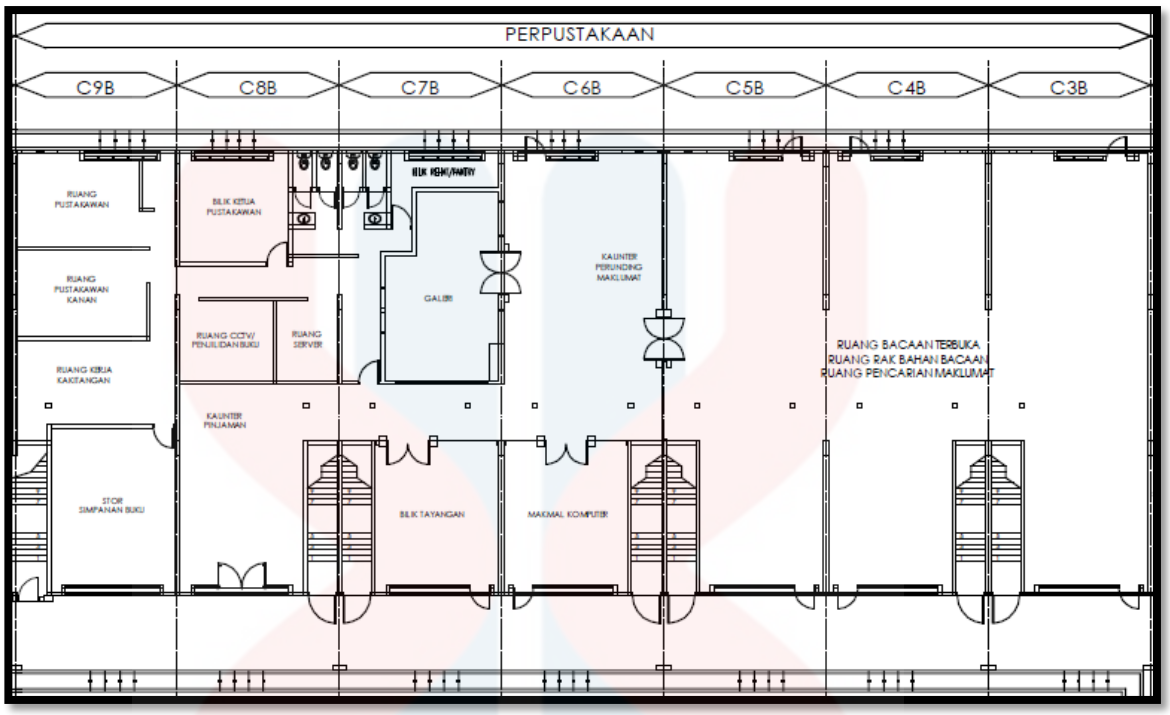


Figure 4.6: UMKPC library floor plan

First, UMK should provide a TV room for leisure purpose. Yes, it does have a TV room in UMKPC (Figure 4.7) but the rooms are not fully used as the sounds leaking through the corridors walls. Second, there should be discussion room where groups can discuss their work. The discussion room must also be equipped with the audiovisual (AV) facilities where students can practice presentations, work on group projects, and all. Successful learning spaces supply furniture and equipment to meet student needs (Cunningham & Tabur, 2012). Third, it should have individual, quiet study space. It should be in an open space where minimal conversations are allowed but keep it brief. Fourth, silent study space is a must space for students who wish to study in the most quiet condition where talking is not allowed. It is expected that by the beginning of the next semester the quiet study room will be furniture with brand new tables of adequate

size to provide sufficient space to accommodate library computers/laptops, reading materials, supplies etc (Tanacković *et al.*, 2013).

These four factors is a must which every library needs to have it. Despite these reports, other writers have proposed that students clearly appreciate the fact that it is socially acceptable to be alone in the library doing their works (Bennett *et al.*, 2005). It was also supported by (Cunningham & Tabur, 2012) where library learning spaces typically consist of sub-spaces or zones intended for different activities such as quiet study, group work, socializing, eating, mobile phone usage, and computer access. Research on faculty use of academic library space per se simply does not exist; the literature on faculty use of academic library space focuses exclusively on information-seeking behaviors or the use of specific resources (Engel & Antell, 2004).

In July, fewer students were spotted in UMKKJ libraries as most of the students were having their semester break. Students' presence in UMKKJ was due to the short semester they took. The availability of students was mostly from FIAT Faculty where a number of students were selected to go through the semester whereas Geoscience (SEG) was the only course chosen to take the short semester. UMKKJ once again managed to avoid noise pollution for not exceeding the WHO levels (50 dB(A)) where both morning and evening data were 45.73 dB(A) and 48 dB(A) respectively. As mentioned before, there were no students inside the library of UMKPC where only staff and librarians were spotted. Supposedly, the sound level in UMKPC for this month should be less than 50 dB(A) but things had gone worse as the staff itself were ignoring the rule of the library such as talking thus increasing the sound level (55.86 dB(A) and 56.3 dB(A)).

Human activities are served by technology supports, and library employees, library practices, library values, and student behaviors largely conform to the system which most activities that take place in the library are academic in nature, both by definition and execution (Suarez, 2007).

In conclusion, Figure 4.4 clearly showed that for three months data collected in UMKKJ was below than WHO standard level while for UMKPC all three months were exceeding the level stated by WHO.

FYP FSB

UNIVERSITI
MALAYSIA
KELANTAN

4.1.5 Comparison of Average Sound Level in UMK Libraries with WHO during night time

Figure below (Figure 4.7) showed the average sound level for both libraries in the UMK campus in night time being compare with WHO standard.

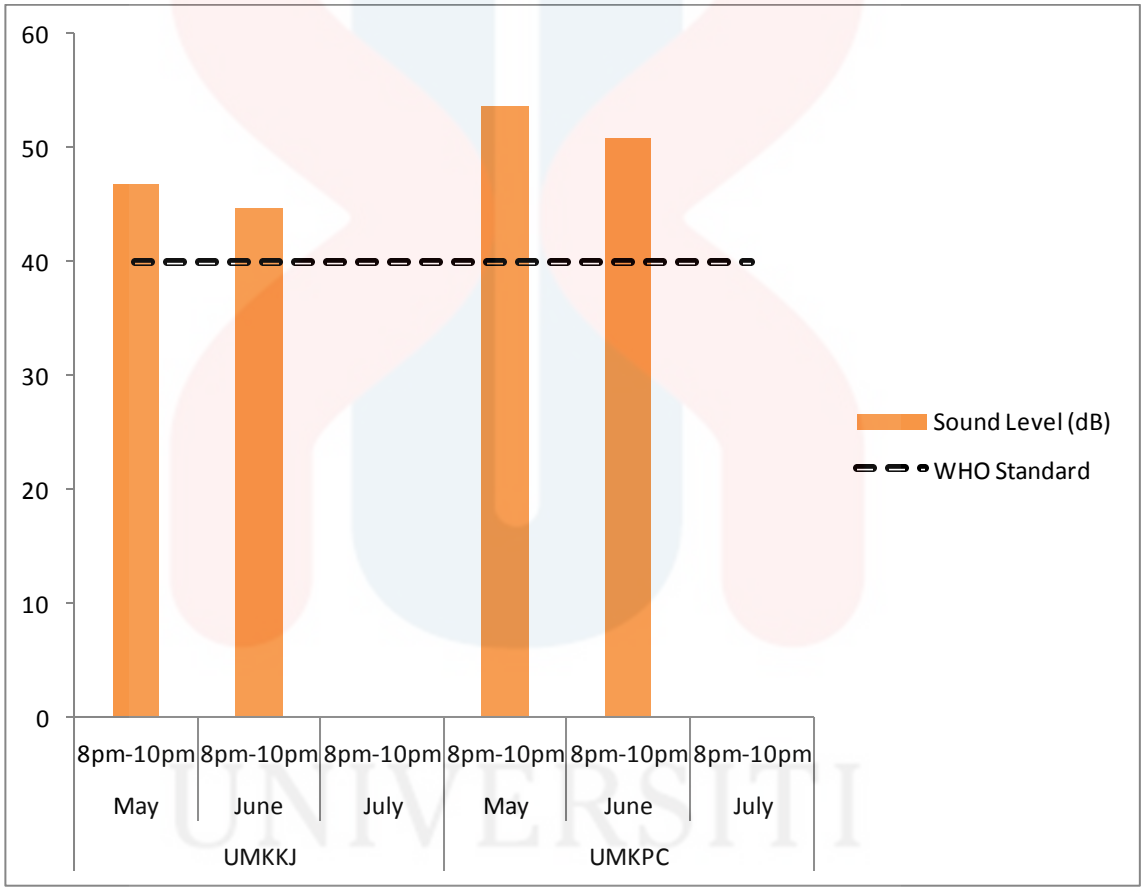


Figure 4.7: Comparison of average sound level in both libraries with WHO during night time

Figure 4.7 illustrated the average sound level found in both libraries during night time being compared with WHO level. As stated, sound levels recorded in both libraries in May during night exceeded 40 dB(A). UMKKJ recorded 46.8 dB(A) which greater than 40 dB(A) while UMKPC recorded 53.7 dB(A) which suddenly higher than 40

dB(A). Students found it effectives to do revision during night time in both libraries due to the limited time they had in the daytime. But in UMKPC the sound level was found higher than the standard level at almost every time.

In June data collection, it was the same for both libraries where it were surpassed 40dB(A). As mentioned before, it was a month where students were busy preparing themselves to sit for the final exam. This was important as initial learning is equally important in that it determines the potential for transfer to occur, and this potential is then realized to varying degrees depending on the transfer context (Butler, 2010). Supposedly, the relationship between the numbers of students visit was affecting the sound level in a certain level especially examination month. This hypothesis made was clearly supported by (Walton, 2006) where he stated that the period which was identified as being the most pressured for library use was during exam periods and found out that students said they were deterred from library use because of the heightened noise levels and also the lack of space. But Figure 4.7 above indicates that the sound level recorded in June was slightly decreasing as compared in May data collection. As shown in figure above (Figure 4.7), there were no data collected in night time for both libraries during July month. This was due to the library was closed as the staff and librarian doesn't work on night shift. Data collection was not able to be taken because libraries closed at 5pm. So, the relationship made before was not valid in this study.

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

4.2 Statistical Analysis for UMKKJ and UMKPC

Table 4.2 below showed the Kruskal-Wallis test which has been done in UMKKJ to test the data normality and its significance among the variable used.

Table 4.2: Kruskal-Wallis test for UMKKJ

Test Statistics [a,b]

	Sound_Level
Chi_Square	26.860
df	2
Asymp.sig	.000

a. Kruskal Wallis Test
b. Grouping Variable: TIME

The above table (Table 4.2) showed the Kruskal-Wallis test for UMKKJ. The data was significantly different as the calculated data (0.00) was below than p-value < 0.05. The reason Kruskal-Walis test was used instead of one way ANOVA was due to the data obtained was abnormal yet insignificance when being tested.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

Table 4.3: Kruskal-Wallis test for UMKPC

Table 4.3 below indicates the Kruskal-Wallis test which has been done in UMKPC in order to get data significant between the variable used.

Test Statistics [a,b]

	Sound_Level
Chi_Square	35.963
df	2
Asymp.sig	.000

a. Kruskal Wallis Test

b. Grouping Variable: TIME

The above table (Table 4.3) showed the Kruskal-Wallis test for UMKPC. The data was significantly different as the calculated data (0.00) was below than p-value < 0.05. There were huge differences between the two library campuses in the UMK as being stated above (refer Table 4.2 & 4.3).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

CHAPTER 5

CONCLUSION

5.1 Conclusion

Noise is an unwanted consecution to modern life which can obstruct with sleep, work, and study and in extremes may cause physiological and psychological disorder. Hence, this mental and physical stress affects the general well being of those who are exposed to it especially students. The common type of noise pollution detected in this study was the occupational noise. Occupational noise is a noise that hearing loss which is a function of continuous or intermittent noise exposure and duration, and which usually develops slowly over several years. This occupational noise will affects the students in their course of study and due to the study environment they exposed to.

In UMKPC library the environment are regarded as noisy by the WHO level. In fact, the level of noise in UMKPC library both by day and night time has become astounding thus affecting the health and condition of the students. In this study, it was proven that UMKPC was likely to be exposed to the indoor noise pollution as the data recorded always exceeding the standard which has been state by WHO as compared to UMKKJ library. The mean sound level recorded in May was the highest among all three months, 51.92 dB(A), followed by June, 49.16 dB(A) and last was July, 34.32 dB(A).

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

The noise are derived from many different sources and talking is perhaps the most universal and problematic source to avoid in students today. Noise pollution is a severe but it has been neglected issues in both UMKPC and UMKKJ library. Sooner or later, the main findings of the study are, the noise pollution level in both libraries of Universiti Malaysia Kelantan will become unsafe the day to come. So, it is time to take this problem seriously with proper measures to secure health and student's welfare of present and future generation.

FYP FSB

UNIVERSITI
MALAYSIA
KELANTAN

5.2 Recommendation

To improve this study, a survey can be conducted in the future as to get the more accurate data in completing this study. A questionnaire should be given to the students and staff in both libraries. By having questionnaire, students and staff behaviors and their daily routines inside the library can be observed as well as managed in a matter of time.

Also, secondary data can also be done as to support the primary data. Secondary data refers to data that was collected by someone other than the user. Common sources of secondary data for social science include censuses, information collected by government departments, organizational records and data that was originally collected for other research purposes.

To add on, noise pollution is the easiest pollution to control only if there are awareness among people especially students where solution can be found and applied to daily basis. Education, awareness and motivating programs can be carrying out in each library to talk about the noise pollution.

It is time for the librarian in both libraries to patrons the situation inside. Patrons were never monitored in both libraries in any way by library staff. By having patrons, noise pollution can be manage and reduce. For example, if patrons are done, students will automatically stay put and behave themselves.

In order to reduce the noise pollution, existing rules on noise pollution inside the library should be enforce. In library, rules already exist but students are unaware of them and at the same time library staffs do not enforce them to do so.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

References

Acker, S. R., & Miller, M. D. (2005). Campus Learning Space: Investing in How Students Learn. *Educause Research Bulletin, 2005*(8), 1-11.

Akay, A., & Onder, S. (2015). Reduction of Traffic Noise Pollution Effects by Using Vegetation, Turkey' Sample. *Journal of Engineering and Economic Development, 2*(2), 13.

Akhtar, J., Anjum, N., & Iftikhar, N. (2011). Evaluation Of The Impact Of Noise Pollution On Students In Congested Area Of Rawalpindi. *Environmental Design Programme*, 1-9.

Alsubaie, D. A. S. R. (2014). Indoor Noise Pollution in Elementary Schools of Eastern Province, Saudi Arabia. *Journal of Research in Environmental Science and Toxicology, 3*(2), 25-29. doi: DOI: http:/dx.doi.org/10.14303/jrest.2014.008

Applegate, R. (2009). The Library Is for Studying: Student Preferences for Study Space. *The Journal of Academic Librarianship, 35*(4), 341-346.

Bell, S. J. (2008). Stop Having Fun and Start Being Quiet: Noise Management in the Academic Library. *Library Issues, 28*(4), 1-4.

Bennett, S., Demas, S., Freeman, G. T., Frischer, B., Oliver, K. B., & Peterson, C. A. (2005). Library as Place: Rethinking Roles, Rethinking Space. *Council on Library and Information Resources, 129*, 89.

Breysse, P. N., & Lees, P. S. J. (2006). Noise. *School of Public Health*, 1-49.

Bulunuz, N. (2014). Noise Pollution in Turkish Elementary Schools: Evaluation of Noise Pollution Awareness and Sensitivity Training. *International Journal of Environmental & Science Education, 9*, 215-234. doi: Doi:10.12973/ijese.2014.212a

Butler, A. C. (2010). Repeated Testing Produces Superior Transfer of Learning Relative to Repeated Studying. *Journal of Experimental Psychology, 36*(5), 16. doi: DOI: 10.1037/a0019902

Clark, J. H., & Siddall, M. J. (2013). Problems in residential design for ventilation and noise. *Proceedings of the Institute of Acoustics, 35*(1), 14.

Cunningham, H. V., & Tabur, S. (2012). Learning space attributes: reflections on academic library design and its use. *Journal of Learning Spaces, 1*(2), 6.

De Giuli, V., C.M., P., De Carli, M., & Di Bella, A. (2013). Overall Assessment of Indoor Conditions in a School Building: an Italian Case Study. *Int. J. Environ. Res, 8*(1), 1-12.

Debnath, D., Nath, S.K, & Barthakur, N. K. (2012). Environmental Noise Pollution in Educational Institutes of Nagaon Town, Assam, India. *Global Journal of Science Frontier Research, 12*(1).

Douglas, V. A., & Rabinowitz, C. E. (2016). Examining the Relationship between Faculty-Librarian Collaboration and First-Year Students' Information Literacy Abilities. *College & Research Libraries*, 20. doi: 10.5860/crl.77.2.144

Dreossi, R. C. F., & Momensohn-Santos, T. (2005). Noise and its interference over students in a classroom environment: literature review. *Artigo de Revisão de Literatura, 17*, 251-258.

Dursun, Ş., ÖzdemİR, C., Karabörk, H., & Koçak, S. (2006). Noise pollution and map of Konya city in Turkey. *J. Int. Environmental Application & Science, 1*(1-2), 63-72.

Engel, D., & Antell, K. (2004). The Life of the Mind: A Study of Faculty Spaces in Academic Libraries. *College & Research Libraries, 65*(1), 8-26.

Gerhardsson, L., & Nilsson, E. (2013). Noise Disturbances in Daycare Centers Before and After Acoustical Treatment. *Journal of Environmental Health, 75*(7), 36-40.

González, A. E. (2014). What Does "Noise Pollution" Mean? *Journal of Environmental Protection,, 5*, 340-350. doi: http://dx.doi.org/10.4236/jep.2014.54037

Guarnaccia, C., Quartieri, J., & Ruggiero, A. (2014). Acoustical Noise Study of a Factory: Indoor and Outdoor Simulations Integration Procedure. *International Journal of Mechanics, 8*, 298-306.

Gümgüm, H. B. (2012). Noise Pollution in the Tigris River Basin Provinces (Turkey). *Journal of Environmental Health, 1*(4), 142-145.

Hammer, M. S., Swinburn, T. K., & Neitzel, R. L. (2014). Environmental Noise Pollution in the United States: Developing an Effective Public Health Response. *Environmental Health Perspectives, 122*(2), 115-119. doi: http://dx.doi.org/10.1289/ehp.1307272.

Hays, M. J., Kornell, N., & Bjork, R. A. (2012). When and Why a Failed Test Potentiates the Effectiveness of Subsequent Study. *Journal of Experimental Psychology*, 8. doi: 10.1037/a0028468

Kim, K. (2015). Sources, Effects, and Control of Noise in Indoor/Outdoor Living Environments. *Journal of the Ergonomics Society of Korea, 34*(3), 265-278.

Kjaer, B. a. (2000). *Environmental Noise*: Bruel & Kjaer Sound and Vibration Measurement A/S.

Lange, J., Miller-Nesbitt, A., & Severson, S. (2015). Reducing noise in the academic library: the effectiveness of installing noise meters. *Library Hi Tech, 34*(1), 45-63. doi: 10.1108/LHT-04-2015-0034

Latif, M. B., Islam, M. S., & Ali, M. S. (2014). A Study on Noise Pollution of Gazipur City Corporation. *J. Environ. Sci. & Natural Resources, 7*(2), 17-23.

Lemoore. (2010). Noise Characteristics and Measurement. *2030 Lemoore General Plan*, 1-17.

Lippincott, J. K. (2010). A mobile future for academic libraries. *Emerald Group Publishing Limited, 38*(2), 205-213. doi: 10.1108/00907321011044981

Lundquist, P., Holmberg, K., & Landstrom, U. (2000). Annoyance and effects on work from environmental noise at school. *A Bimonthly Inter-disclipinery International Journal, 2*(8), 39-46.

Mac, J. D. (2010). Noise & Noise Measurement. from http://www.southwoodresources.com.au/southwood/pdf/planning/APPMSEMF.PDF

Mappala, A. U., & Javier, S. F. T. D. (2010). Estimation And Mapping Of Vehicular Traffic-Induced Noise Along A. Bonifacio Avenue And Sumulong Highway In Marikina City. *National Center for Transportation Studies*, 1-13.

Moudon, A. V. (2009). Real Noise from the Urban Environment: How Ambient Community Noise Affects Health and What Can Be Done About It. *American Journal of Preventive Medicine, 37*(2), 167-171.

Obot, O. W., & Ibanga, S. M. (2013). Investigation Of Noise Pollution In The University. *International Journal of Engineering Research & Technology (IJERT), 2*(8), 1-11.

Ozer, S., Yilmaz, H., Yesil, M., & Yesil, P. (2009). Evaluation of noise pollution caused by vehicles in the city of Tokat, Turkey. *Scientific Research and Essay, 4*(11), 1205-1212.

Pujol, S., Berthillier, M., Defrance, J., Lardies, J., Levain, J.-P., Petit, R., . . . Mauny, F. (2014). Indoor Noise Exposure at Home: A Field Study in the Family of Urban Schoolchildren. *Indoor Air*, 1-10.

Reenen, C. A. v. (2015). A case study investigation of the indoor environmental noise in four urban South African hospitals. *Proceedings of Meetings on Acoustics, 25*, 1-9. doi: 10.1121/2.0000134

Rubinić, D. (2012). Information behaviour of university students: a literature review. *Proceeding of the Summer School in User Studies, 7*(1), 105-118.

Schaeffer, G. H., & Patterson, M. L. (2013). Studying preferences, behavior, and design influences in a university library. *Department of Psychology*, 5.

Shield, B. M., & Dockrell, J. E. (2003). The Effects Of Noise On Children At School: A Review. *J. Building Acoustics, 10*(2), 97-106.

Singh, R., & Pandey, G. (2013). A Study of Noise in Gorakhpur City, Uttar Pradesh (India). *International Journal of Structural and Civil Engineering Reseach, 2*(3), 1-11.

Sjödin, F., Kjellberg, A., Knutsson, A., Landström, U., & Lindberg, L. (2012). Noise exposure and auditory effects on preschool personnel. *Noise & Health, 14*(57), 72-82.

Smith, S. D., Caruso, J. B., & Kim, J. (2010). The ECAR study of undergraduate students and information technology. *Students and Information Technology*(6), 1-120.

Stansfeld, S. A., & Matheson, M. P. (2016). Noise pollution: Non-Auditory Effects On Health. *British Medical Bulletin, 68*, 24-257. doi: DOI: 10.1093/bmb/ldg033

Suarez, D. (2007). What Students Do When They Study in the Library: Using Ethnographic Methods to Observe Student Behavior. *Electronic Journal of Academic and Special Librarianship, 8*(3).

Tanacković, S. F., Lacović, D., & Gašo, G. (2013). Student Use of Library Physical Spaces: Unobtrusive Observation of Study Spaces in an Academic Library. 1-9.

Tripathi, V., Pandey, D. G., & Singh, D. S. P. (2014). Assessment of Outdoor and Indoor Noise Pollution in Silence Zone of Gorakhpur City. *International Journal of Engineering Research & Technology (IJERT), 3*(12).

Walton, G. (2006). Learners demands and expectations for space in a University Library: outcomes from a survey at Loughborough University. *Nowal Conference*, 1-25.

Woolner, P., & Hall, E. (2010). Noise in Schools: A Holistic Approach to the Issue. *International Journal of Environmental Research and Public Health, 7*, 1-15. doi: 10.3390/ijerph7083255

World Health Organization (1980). Environmental Health Criteria 12: Noise. Geneva, WHO. Retrieved from http://www.inchem.org/documents/ehc/ehc/ehc012.htm (21/11/2016).

World Health Organization (WHO), (2001). Occupational and community noise. Retrieved from www.who.int/peh/Occupational_health/OCHweb/OSHpages/.../noise.pdf (23.09.2013).

World Health Organization (WHO), (2002). Children Health and the Environment. Retrieved from http://www.who.int/ceh/capacity/noise.pdf (24.5.2014).

World Health Organization (WHO), (2004). Occupational Noise. Retrieved from http://www.who.int/quantifying_ehimpacts/publications/en/ebd9.pdff (09.11.2016).

FYP FSB

UNIVERSITI MALAYSIA KELANTAN

FYP FSB

APPENDIX A

UNIVERSITI
MALAYSIA
KELANTAN

UMKKJ DATA (MAY)

	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	45.9	55.1	45.4
	56.2	46.3	46.1
	46.2	53.7	46.3
	47.6	49.6	47.7
	50.0	47.6	48.2
	46.9	46.8	48.9
	53.4	52.9	49.5
	47.1	57.3	48.5
	46.3	54.0	45.2
	47.2	49.2	46.3
	47.7	55.6	52.4
	46.9	50.8	45.9
	50.0	54.5	45.0
	53.6	50.3	53.1
	46.0	51.1	51.1
	55.2	50.6	51.4
	47.3	51.1	49.6
	53.6	50.8	49.7
	49.1	50.4	48.3
	49.3	47.6	47.6
	57.7	52.8	48.2
	52.2	55.1	48.8
	53.2	53.5	48.0
	52.2	51.7	51.4
	56.2	49.4	52.8

FYP FSB
UNIVERSITI MALAYSIA KELANTAN

UMKPC DATA (MAY

	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	55.8	56.3	55.3
	55.2	55.2	54.9
	56.3	50.8	54.7
	56.1	55.3	54.8
	59.1	58.0	55.0
	57.2	54.7	58.8
	73.6	56.8	54.4
	62.3	56.3	54.8
	57.7	55.4	56.3
	55.9	60.2	55.2
	56.9	61.2	55.2
	58.2	56.5	54.8
	59.3	56.9	59.8
	56.8	62.2	54.5
	62.1	55.0	58.6
	58.2	56.4	55.0
	61.6	54.4	55.4
	60.0	55.5	55.6
	60.8	57.5	54.7
	58.3	70.0	56.6
	57.0	70.9	58.2
	65.1	61.3	56.1
	61.0	60.5	55.6
	58.8	63.3	55.8
	60.4	58.6	57.6

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

UMKKJ DATA (JUNE)

	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	46.1	45.6	46.8
	47.9	43.0	44.8
	55.7	46.0	44.2
	45.6	45.7	44.2
	46.9	46.6	44.9
	45.7	45.6	43.
	44.7	45.6	44.5
	48.2	45.3	47.5
	43.6	45.5	45.8
	44.6	44.0	43.6
	44.4	46.5	44.8
	45.7	46.4	48.8
	54.6	46.3	44.9
	51.8	46.0	43.9
	55.5	45.0	47.0
	45.7	44.5	55.1
	50.5	45.8	45.8
	46.6	46.2	49.9
	45.4	54.9	51.6
	47.2	45.0	44.6
	48.3	53.4	44.4
	47.1	45.3	43.8
	45.4	47.8	44.9
	45.5	45.6	45.6
	45.7	49.0	51.3

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

UMKPC DATA (JUNE)

	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	53.2	55.3	54.4
	53.9	54.4	54.8
	52.6	53.8	55.3
	52.1	58.3	54.7
	53.0	53.5	53.5
	52.5	52.5	55.1
	57.5	61.6	54.9
	55.6	52.1	55.2
	53.1	58.0	55.4
	52.4	52.3	54.9
	53.7	53.3	55.5
	57.8	52.4	55.5
	54.7	53.4	54.6
	52.6	52.2	55.0
	54.0	52.7	55.3
	52.2	52.5	55.8
	52.7	55.1	55.4
	57.2	54.4	54.1
	53.0	53.2	54.8
	52.7	53.6	54.5
	54.5	52.2	55.0
	52.8	53.7	54.3
	53.8	53.2	54.6
	52.8	53.4	54.9
	52.4	56.1	54.4

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

UMKKJ DATA (JULY)

	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	45.0	47.6	-
	44.0	59.9	-
	46.2	53.8	-
	45.3	50.0	-
	46.9	54.0	-
	44.7	55.9	-
	44.3	50.2	-
	44.7	47.1	-
	45.8	48.5	-
	45.1	47.2	-
	46.5	45.0	-
	48.6	46.4	-
	44.3	45.9	-
	46.0	46.8	-
	44.9	45.3	-
	46.9	45.8	-
	44.4	45.1	-
	48.3	45.4	-
	44.7	45.5	-
	46.5	46.3	-
	45.3	45.4	-
	46.6	45.7	-
	46.2	45.1	-
	45.3	46.8	-
	46.8	45.3	-

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

UMKPC DATA (JULY)

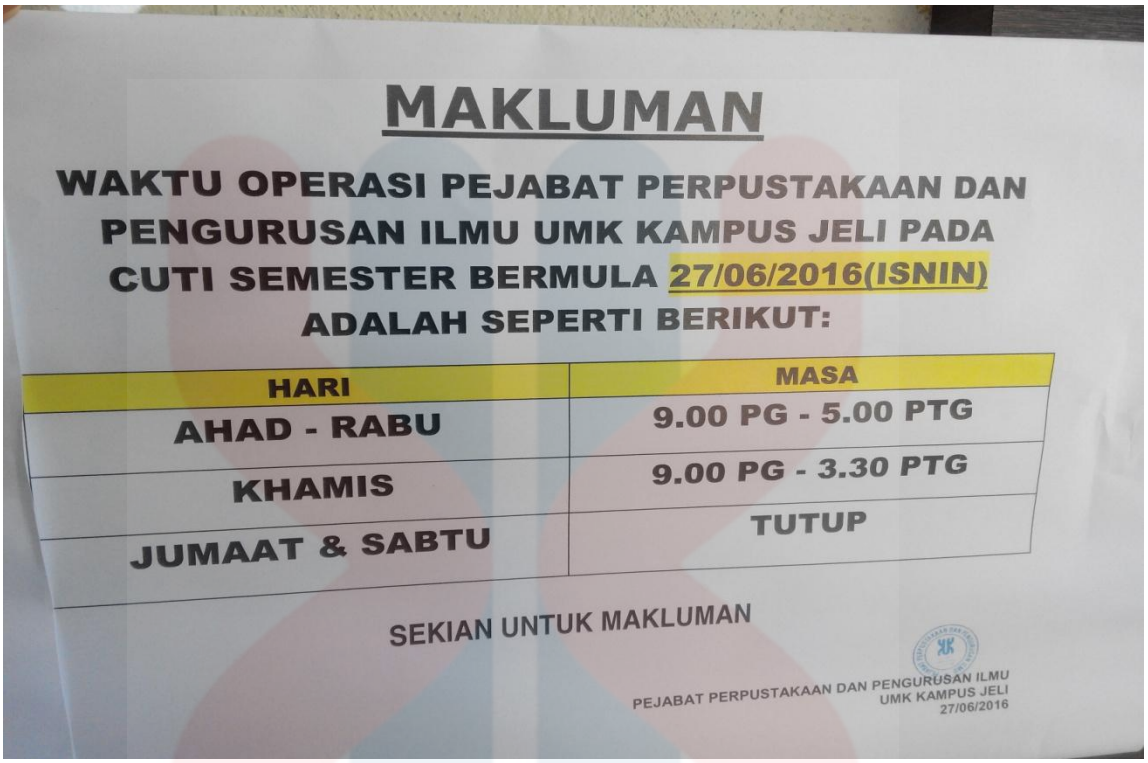
	9.00-11.00am	2.00-4.00pm	8.00-10.00pm
TIME/DECIBEL(dBA)	59.7	56.8	-
	55.8	56.2	-
	55.4	56.3	-
	55.5	56.1	-
	55.7	56.5	-
	56.0	56.3	-
	56.1	57.5	-
	55.5	56.4	-
	55.9	56.7	-
	56.0	56.2	-
	55.6	56.0	-
	55.6	55.6	-
	55.9	57.2	-
	55.6	56.1	-
	56.0	56.0	-
	55.9	56.8	-
	55.6	55.6	-
	55.0	56.2	-
	55.4	55.5	-
	55.9	56.0	-
	55.5	56.2	-
	55.4	56.2	-
	56.8	56.1	-
	55.6	56.8	-
	55.2	55.9	-

FYP FSB
UNIVERSITI
MALAYSIA
KELANTAN

FYP FSB

APPENDIX B

UNIVERSITI
MALAYSIA
KELANTAN



MAKLUMAN

WAKTU OPERASI PEJABAT PERPUSTAKAAN DAN PENGURUSAN ILMU UMK KAMPUS JELI PADA CUTI SEMESTER BERMULA 27/06/2016(ISNIN) ADALAH SEPERTI BERIKUT:

HARI	MASA
AHAD - RABU	9.00 PG - 5.00 PTG
KHAMIS	9.00 PG - 3.30 PTG
JUMAAT & SABTU	TUTUP

SEKIAN UNTUK MAKLUMAN

PEJABAT PERPUSTAKAAN DAN PENGURUSAN ILMU
UMK KAMPUS JELI
27/06/2016

Library schedule during semester break.

UMKPC reading area.

Online database centre in UMKPC.

TV room in UMKPC.

UMKKJ study zoning with open and partitioned tables.

UMKKJ open study area.

FYP FSB
UNIVERSITI MALAYSIA KELANTAN