

**ERGONOMIC FACILITIES IN SPECIAL EDUCATION
SCHOOL**

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**FACULTY OF ENGINEERING
UNIVERSITY OF MALAYA
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EDUCATION SCHOOL**

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Field of Study: School Ergonomics

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ABSTRACT

This study is about the identification of ergonomic facilities provided in different types of special schools through questionnaire instrument and observation during the school survey visit. These schools are of students with vision disability, hearing deficiency and learning disability. The facilities provided in the Special Education School are not exactly the same as the normal schools. Thus it has to be given attention while providing ergonomic facilities in order to serve the student's need respectively. There were different categories of ergonomic facility provided around all these special education schools in terms of classroom condition, lighting, ventilation, furniture, library and other basic necessity. This research project also involves the evaluation of the importance for providing ergonomic facilities in the Special Education School from the perceptive of school management, teachers and non-academic staff. The facilities provided in the Special Education Schools should not only be safe but also help the students to improve the potential and carry out their daily activity without any difficulties.

Keywords: Disability, Ergonomics, Facilities, Special Education School

**PENGAJIAN ASPEK ERGONOMIK BAGI KEMUDAHAN DI SEKOLAH
KHAS**

ABSTRAK

Projek ini adalah tentang pengenalpastian semua kategori kemudahan ergonomic yang disediakan di pelbagai jenis sekolah khas melalui pengedaran borang soal-selidik dan pemerhatian ketika lawatan ke sekolah. Sekolah-sekolah khas yang terlibat terdiri daripada pelajar yang mempunyai kecacatan penglihatan, kekurangan pendengaran dan ketidakupayaan belajar. Kemudahan- kemudahan yang disediakan di sekolah pendidikan khas adalah tidak sama seperti yang disediakan di sekolah aliran perdana. Oleh itu, perhatian khas perlu diberi ketika menyediakan kemudahan-kemudahan supaya dapat memenuhi keperluan pelajar. Terdapat pelbagai kategori kemudahan ergonomic seperti suasana bilik darjah, kecahayaan, pengudaraan, perabot, perpustakaan, dan kemudahan asas lain yang disediakan di semua jenis sekolah pendidikan khas. Projek penyelidikan ini juga melibatkan penilaian kepentingan menyediakan kemudahan ergonomic di sekolah pendidikan khas dari persepsi pengurusan sekolah, guru dan kakitangan bukan akademik. Kemudahan- kemudahan ini bukan sahaja perlu selamat digunakan tetapi mestilah membantu pelajar untuk meningkatkan potensi dan menjalankan aktiviti harian mereka tanpa sebarang kesulitan.

Keywords: Kelainan Upaya, Ergonomik, Kemudahan, Sekolah Pendidikan Khas,

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LIST OF SYMBOLS AND ABBREVIATIONS

KPM	:	Kementerian Pelajaran Malaysia
MOE	:	Ministry of Education
PHd	:	Doctor of Philosophy
SEIP	:	Special Education Integrated Program
BPK	:	Bahagian Pendidikan Khas

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CHAPTER 1: INTRODUCTION

1.1 PROJECT BACKGROUND

The aim of this research to investigate in detail regarding the ergonomic facilities provided in different type on special education school. These schools include students with vision deficiency, hearing deficiency and slow learner. This research also includes the evaluation on the importance of the need of ergonomic aspect on the facilities provided in the school which includes the benefits that the students gain through the ergonomic facilities.

Disability is a condition when it restricts a person's interaction and action due to their physical, mental and sensory impairment. Some of the disability conditions are vision disability, hearing deficiency, learning disability and mobility disability. Students with disability have equal rights in obtaining effective education in order to be a successful person in their future.

Education is the most important aspect that needs to be given attention in order to produce intellectual individual for the development of the country. This can be the stepping stone in achieving the "Falsafah Pendidikan Negara" which is to produce advance individual in terms of intellectual, spiritual, physical, emotional and social. All the students in Malaysia have equal rights in obtaining education at all levels without regards to the age, gender, race, religion and their physical abilities. Thus, there are many Special Education Schools around in order to provide the suitable education for disable students. These types of Special Education Schools has the same education level as normal schools where its starts from Pre-Schools, Primary Schools and Secondary Schools.

Ergonomic is a term used in when a design of working equipment or flow of work that provide comfortable environment and working condition in order to gain efficiency

output. It is important to consider the ergonomic aspect in the facilities provided in Special Education Schools in order to provide optimum learning opportunity to their students. Some of these basic facilities are classroom, laboratory, sensory room, walk way and so on. These special students can be trained to independent and improve their potential through an ideal education system.

1.2 OBJECTIVE

1. Identify ergonomic facilities provided for the Special Education Schools
2. Evaluate the importance of providing ergonomic facilities in Special Education Schools.

1.3 PROBLEM STATEMENT

The facilities provided in Special Education Schools such as vision disability school, hearing deficiency school and learning disability schools are not same as provided in the normal schools. In fact, these Special Education Schools also have different types of facilities respectively according their students' needs which depend on their type of disability. The facility must have proper design and specific safety measures in accordance with the ergonomic factor. This ergonomic factor on the facilities provided in Special Education School must be given priority and more concern as it is for the use of special child and to avoid any unwanted injuries to their students.

Besides that, ergonomic facility provided must be given equal importance as its safety and comfort measure. Furthermore, whether the facility provided is suitable or not for the student and will it helps them to enhance their performance is another major issues that be taken in concern. The facilities provided in the school should not only be safe for the use but it must also be beneficial for the students and make their daily activities easier to be carried out.

1.4 SCOPE OF THE PROJECT

The scope of this project will be as follows:

1. Observation through the school visit on the ergonomic aspect of the facilities provided in Special Education Schools.
2. Distribution of questionnaire forms to management, teachers and non-academic staff in the schools.
3. The project result will be obtained based on the observation during the visit, evaluation on the distributed questionnaire result and informal interview with teachers of the school.
4. The project does not include student's parents in providing any information regarding the project.
5. The project involves only government primary schools, private schools, secondary schools and vocational schools are excluded from this research.
6. The recommendation on the ergonomic improvement that can be done on the facilities provided in the school is not included.

1.5 SIGNIFICANT OF THE PROJECT

The presence of ergonomic facility provided in the Special Education School for the student's usage is very important in terms of carrying out their daily task effectively. Ergonomically design facilities around the school also play major roles in encourage the student to be more active throughout the school timing without giving then external physical and mental stress. This project can be helps to gain the idea that the ergonomic aspect on the facilities is equally important as the safety feature and should not be ignored. Moreover, it can be an encouragement for the growth and usage of ergonomically design facilities in Special Education School. As this research project has been approved by Kementerian Pelajaran Malaysia (KPM), this can also be a small part

for them in their future when it comes to the improvement to be done in the Special Education School.

1.6 REPORT OVERVIEW

There are overall 5 chapters in this report which are Introduction, Literature Review, Project Methodology, Result and Analysis and lastly Conclusion and Suggestion. Chapter 1 discuss about the project background, problem statement, objective, scope of project and significant of project.

Chapter 2 is mainly about the literature review on the previous study on education for students with disability, types of different disability among students, ergonomic advantages and ergonomic facilities in Special Education School followed with existing work that has been done on this topic.

Chapter 3 is the Project Methodology where all the method used to complete the project will be discussed. It also states the flow of the steps in completing this project.

Chapter 4 will brief regarding all the result obtain and result analysis through the distributed questionnaires in the schools among the management, teachers and non-academic staffs and observation during the visit.

Lastly, Chapter 5 concludes the project and gives some suggestion on improvement that can be done in future.

CHAPTER 2: LITERATURE REVIEW

This chapter is about the study on the related topics to the project such as Disability, Special Education System and Facility of Ergonomics Aspect in Special Education Schools.

2.1 Disability

Disability is the term used to describe individual that has physical or mental impairment which can restrict their daily routine in compare with the usual group of people(Falina & Ahmad Sabri, 2017). The major restrictions faced by a disable person are activity limitation and restriction in participations. Activity limitation is where a person have difficulties in carrying out or completing a task completely as per requirement whereas participation restriction is involving life experiences and normal chores(Shakespeare, 2013). Disability cannot be treated just as a health issue as it affects the interaction of individual with the society and environment they are living in. It is important to have invention that can reduce this barrier of a disable person (Gary L. Albrecht, 2001).

Some of the common impairments that can be found are physical impairment, mental impairment, sensory impairment, cognitive impairment and chronic health disorder. The chart below shows clearly the type of disabilities.

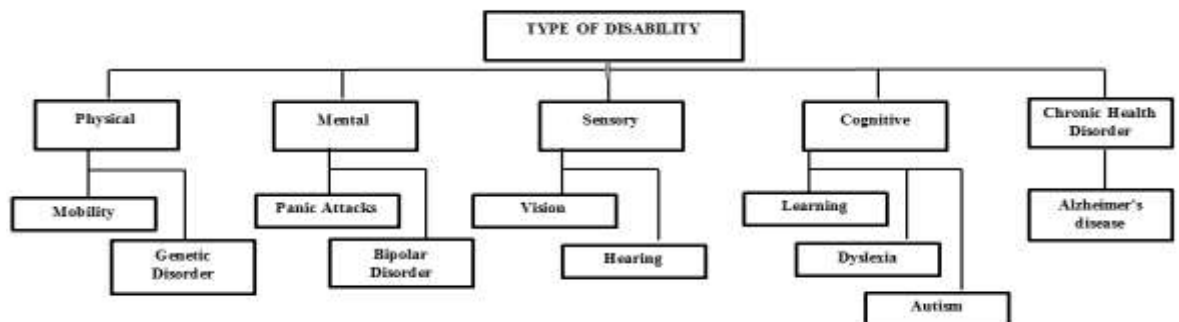


Figure 2.1: Types of Disabilities (Gary L. Albrecht, 2001)

2.1.1 Physical Disability

Physical disability refers to the physical condition of an individual from birth due to genetic problem or any incidents after birth. A person is said to be physically impaired when their mobility, stamina and capacity is affected and is much below than of a normal person. This includes difficulties faced by a person to carry out basic daily routine such as walking, sitting, standing, muscle movements and so on. In majority cases physical disability person are wheelchair users as their mobility ability by themselves are limited. Below are list of some common physical disabilities (Barnes & Mercer, 2010) :

- i. Spinal cord injury
- ii. Manual Dexterity
- iii. Upper or lower limb disability

2.1.2 Mental Disability

Mental disability are tend to be ignored by many as they are not aware of it unless it is at serious stage. Mental disability usually affects the thinking and behaviour of an individual. This is due to the unstable mind and mood of the particular individual. Some of the serious mental disabilities are (Barnes & Mercer, 2010):

- i. Bipolar Disorder

Bipolar Disorder is manic depression where a person has highest to lowest stage of mood swings. This person can be highly angry and depressed at times or extremely happy and energized at certain time. In other words, they experiences extremely level of both positive and negative emotion which cannot be control by them.

ii. Hallucination

Hallucination is when an individual feels or sees something which does not exist in real. In simple words is just an extreme imagination of a person who is ill mentally. Some common types of hallucinations are visual, auditory and command hallucination.

iii. Anxiety Disorder

Anxiety is normal human emotion of nervous or stress at certain situation of life but anxiety disorder is different for this normal human emotion. It is when a person feels excessive amount of this feeling which affects their ordinary lifestyle. This is not considered as a serious problem as there is well medication available to treat this disorder to enable the affected person to lead a normal lifestyle.

iv. Schizophrenia

Schizophrenia is a disorder that affects a person's thinking, feeling and behaviors in their life. These people tend to lost touch in reality and interaction with society around them. It is still consider to be a chronic or severe brain disorder to be overcome.

2.1.3 Sensory Disability

Sensory disability is the situation where a person's one or more main sense such as taste, sight, hearing, touch, smell and spatial awareness is not in ordinary condition or not functioning accordingly. Some of the sensory disabilities are vision impairment, hearing impairment and dual sensory impairment (Barnes & Mercer, 2010).

i. Visual Impairment

Visual impairment and blindness is two different problems. Visual impairment is where a person's vision ability is very low that it cannot be corrected with the use of glasses or lenses whereas blindness is where a person vision is totally lost that they cannot differentiate dark and light.

ii. Hearing Impairment

Hearing impairment can also be known as hearing loss. It can occur only to one ear or in both ears. Hearing impairment is not only the total loss of hearing ability but also partial hearing impairment where a person is also said to be having hearing impairment if they could not hear sound at the decibel range of a normal person.

iii. Dual Sensory Impairment

Dual sensory impairment is where a person experience both vision and hearing impairment. In most cases, it is not the total loss of both senses but partial loss of these two senses. Thus these people have some level of sight and hearing ability.

2.1.4 Cognitive Disability

Cognitive Disability is describes as the limitation a person have on their mental functioning and intellectual skill as communication, social relationship and critical thinking. These make them to be slow in learning something or carrying out task in compare with normal people (Barnes & Mercer, 2010). Learning Disability and autism are the common ones in this category. People with these problems tend to take much longer time to start talking, walking and appear to be less active at most of the time (Hammill, 1990).

2.2 Education

Education is a process of learning or gaining knowledge, technical skills, interpersonal skills and values in life. Everyone should have the equal rights to obtain education accordingly without taking in consideration their age, gender, race, religion and physical or mental ability. Education is the best aspect that gives a person with self-confidence to face the world and lead a successful lifestyle. It also teaches a person to be self-dependent and make a wise decision at every path of his or her life.

2.2.1 Education System of Malaysia

Education system in Malaysia is operation under the supervision of Ministry of Education which is “Kementerian Pendidikan Malaysia (KPM)”. Education Act 1996 is the major legalisation used for matter regarding education in Malaysia (MOE, 2013). Malaysia’s education system is turn out to be one of the top in Asia. This is because the growth and the improvement that the education system has been gone through from the day of independence till now.

The basic purpose of education in every country would be to developed people to improve their existing skill and to learn new things that will be beneficial to themselves, society and country (Yunus, 2001) (M. N. N. Lee, 1999). This goes along with KPM mission which is to *“Upholding a quality education system that develops individual to their full potential and fulfil the aspiration of the nation.”* The Malaysian education system has been divided into several stages as below:

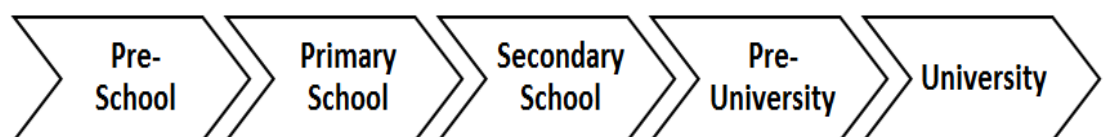


Figure 2.2: Stages of Malaysian Education System (Moses Samuel, 2017)

i. Pre-school

Pre-school education in Malaysia is not compulsory for all as in rural area it is not common whereas in urban area almost all send their children to pre-school. It is for children of age 3-6 years old before they can attend primary education at the age of 7. The education syllabus for pre-school is not fixed by the government and it depends on the particular kindergarten. The purpose is to provide the children with basic knowledge and give greater focus in their social interaction and behavioural development. Mostly these kindergartens are run by private although there is some which is run by government (Muliana Mustafa & M.N.A, 2013).

ii. Primary School

Primary school is for children of age 7-12 which is from Standard 1 to Standard 6 and can be run by either government or private sectors. There are two type of primary education which is run by Malaysia government which are National Schools (*Sekolah Kebangsaan, SK*) and National type School (*Sekolah Jenis Kebangsaan, SJK*). The “SJK” school can be of two types which are *Sekolah Jenis Kebangsaan Cina* and *Sekolah Jenis Kebangsaan Tamil* where Chinese and Tamil is the compulsory language respectively in their curricular syllabus. The students will be test for their understanding at the end of their primary education with Primary School Achievement Test (*Ujian Pencapaian Sekolah Rendah, UPSR*) before they can continue their education to secondary level which is organise by government. The compulsory subjects would be Bahasa Malaysia, English, Mathematics and Science for National Schools whereas Bahasa Malaysia, English, Mathematics, Science and Chinese or Tamil for and National type School respectively (Barghi, Zakaria, Hamzah, & Hashim, 2017).

iii. Secondary School

The Secondary Education is divided into two level which are Lower (Form 1-3) and Upper Secondary (Form 4&5) for students of age 13-17 years old usually. All students who complete primary education are eligible to continue their education at secondary with the condition that their pass their Bahasa Malaysia paper for National School and obtain at least a Grade C for National Type School respectively. If this condition was not meet, the students have to go through Remove “*Peralihan*” classes for 1 year before they could enter Form 1(Moses Samuel, 2017). The students will be tests at the end both level of their secondary education as stated below:

- Lower Secondary with Pentaksiran Tingkatan 3 (PT3)
- Upper Secondary with Sijil Pelajaran Malaysia (SPM)

iv. Pre-University

Pre-University are for those who wish to continue their education after Secondary school. This can be done in government or private as both offer chances for one to continue their education. Pre-University is compulsory before one can continue to undergraduate education. Pre-University program by government are Sijil Tinggi Persekolahan Malaysia (STPM) and Matriculation whereas programs in private are Foundation or A-Levels in common. The duration of these studies are differ from one and another according to the table below(MOE, 2013):

Table 2.1: Duration of Pre-University Program

Program	Duration
STPM	1 ½ years
Matriculation	1-2 years
Foundation	1 years
A-Levels	1 ½ years

v. University

There are several stages of University education and can be done in either Government University or Private Collages/Universities according to one's preference. The chart below show the education level and duration of each education stages:

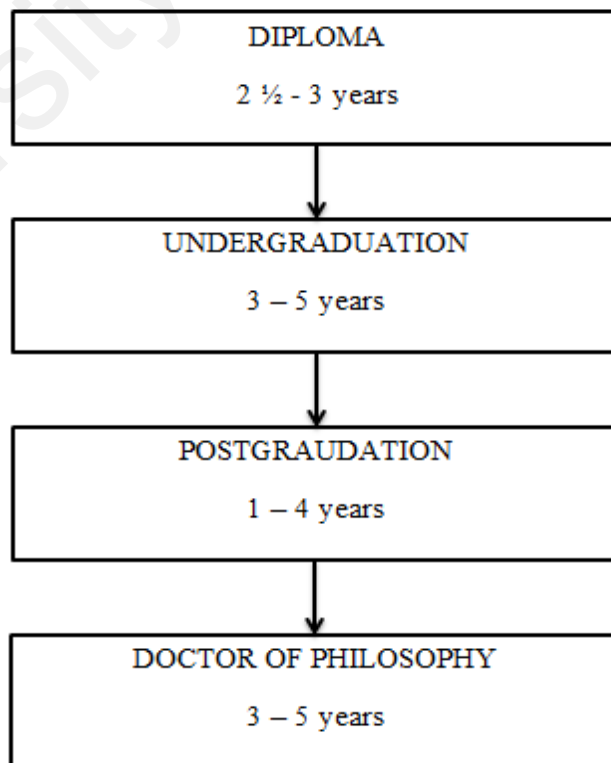


Figure 2.3: University Education Stages(MOE, 2013)

2.2.2 Special Education System of Malaysia

Special Education is to provide knowledge and learning platform for students with disability. This idea of special education is very important as those with disability also equal rights to learn and gain knowledge as the others. (L. W. Lee & Low, 2014). Special Education has been taken into the consideration more nowadays as the Malaysia Education Blueprint 2013-2025 has stated “moving more students with special needs towards inclusive education program and raising the overall quality of provision” as one of its goal.

According to Ministry of Education, there are 3 types of special education system provided to the students with special needs. The figure below shows the summary of the types of schools for special need students and their education system(MOE, 2013).

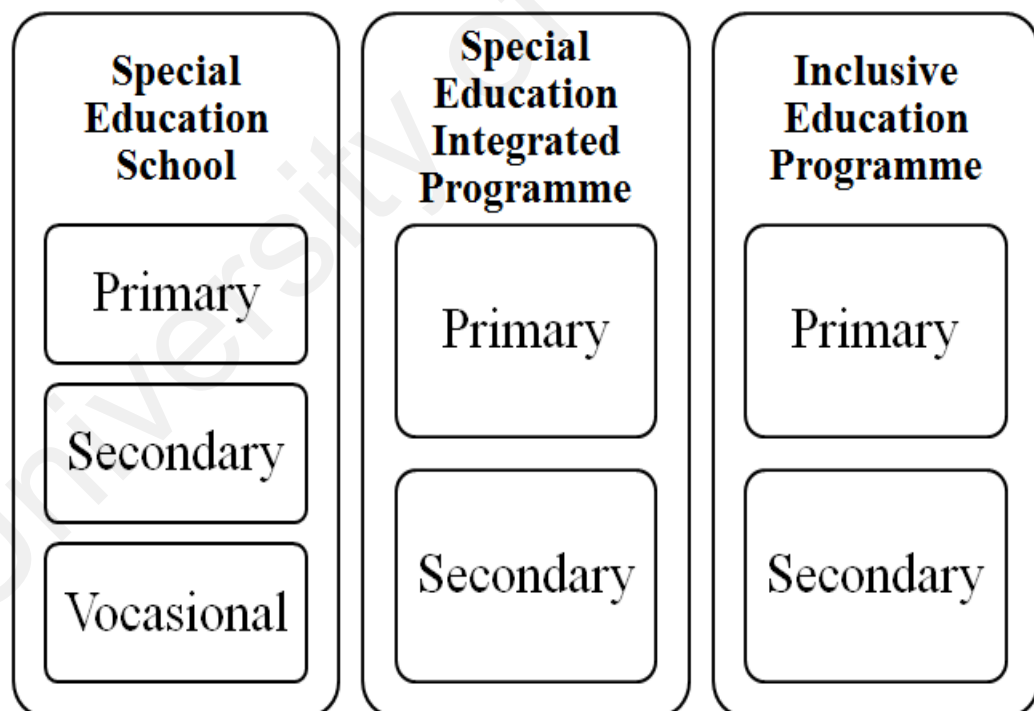


Figure 2.4: Types of Special Education Systems (MOE, 2013)

i. Special Education School

These are Special education schools for disabled students according to their disability such as school for vision disability, hearing disability and learning disability. These schools have their own types of infrastructure and facility management according to their student's needs.

ii. Special Education Integrated Program (SEIP)

This program is by having separate special education classes in mainstream schools. Their curricular system is not necessarily follows the normal curricular syllabus and differs according to the students IQ ability. This program gives an opportunity for the students experience and to live in the environment with normal people.

iii. Inclusive Education Program

Inclusive Education Program is where the disable students are mixed the students in mainstream school in the same class. These special need student will go through the same curricular system as the others. The chart below shows that the goal is to have 75% special need students will be able to be involved in Inclusive Education Program.

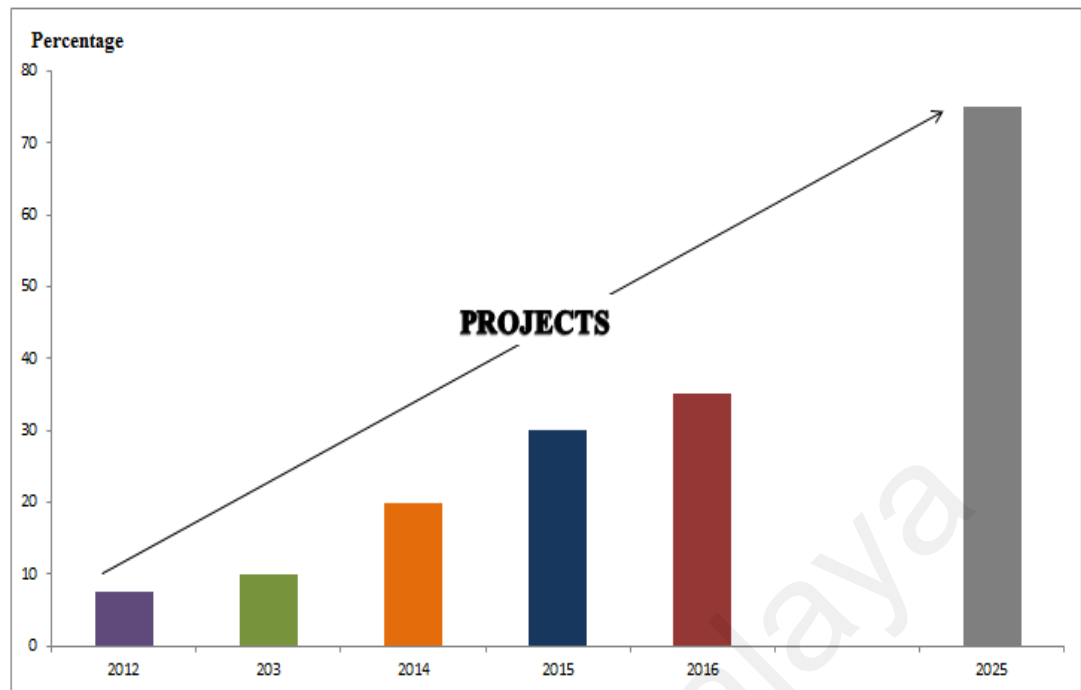


Figure 2.5: Special Need Students in Inclusive Education Program (MOE, 2013)

2.3 Ergonomic

Ergonomics is a term used in designing and preparing tools, equipment, system and surrounding place that can fit a person that make use of it. Ergonomics can also be known as human factor where it is basically used to learn the ability and limitation of human while performing certain task in specific environment (Wilson, 2014). Thus, this outcome of the learning is used in improving interaction between human and tool, equipment, system and workplace. In other words, the person doing a task should be affects by these things and should be able to give the maximum potential in the task.

Ergonomics aspect is familiar used in industry and it has also become one of the common issues that taken in consideration in their working procedures. Ergonomic aspect should also be given equal important in others places such as schools, home, normal office environment and even entertainment places(Elearn, 2009). This is because the effect of ignoring ergonomic aspect in these places will also affect a person ability to perform to their maximum potential.

The chart below represents the important ergonomics indicators that are usually taken in consideration before designing an effective working environment (Fernandes, Hurtado, & Batiz, 2015).

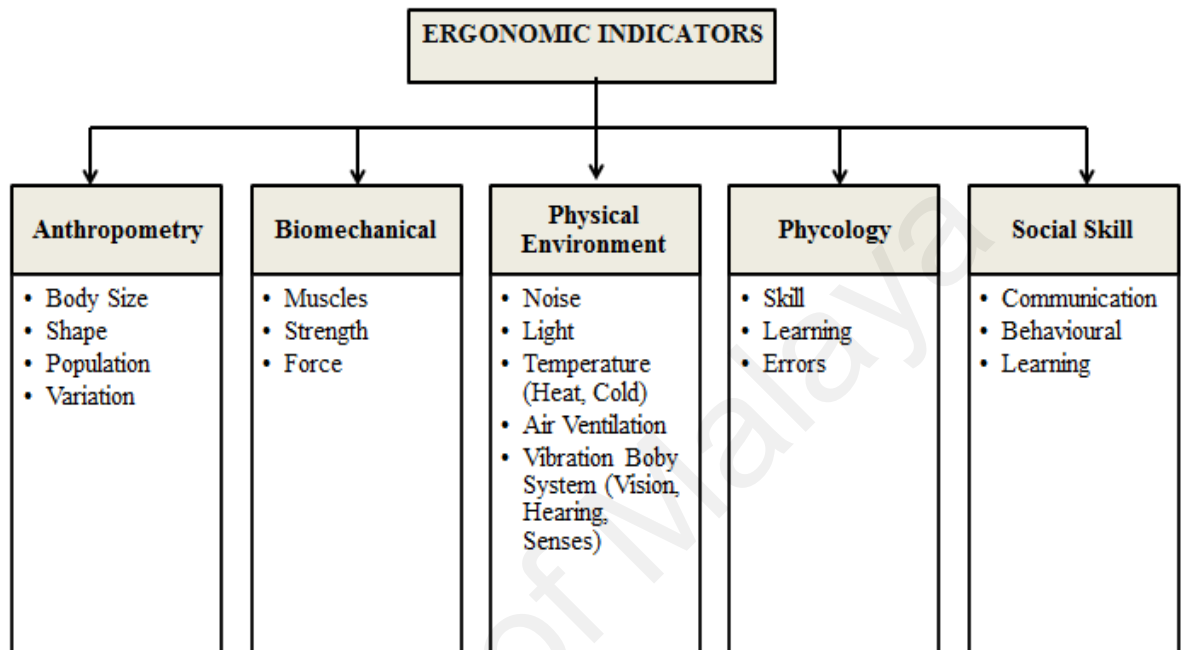


Figure 2.6: Ergonomics Indicators in Designing (Fernandes et al., 2015)

2.3.1 Ergonomic Advantages

Ergonomics are basically used to create an environment which is safe, comfortable and efficiency place to perform any kind of work or task by fitting the task to people and not people adjusting them to fit the task. There are some major advantages by having ergonomically design surrounding such as:

- i. Reduce injuries and health issues

Adequate tools, facilities and system reduce the chance of any accident to occur. For example, a proper walkway and arrangement of a place reduce the possibility for one to slip and fall. Health issues such as breathing problem can be overcome by having a suitable ventilation system and stress can be reduce by having an effective working time routine(Elearn, 2009).

ii. Safe Environment

Ergonomically design place reduce the possibilities a person getting affected from this surrounding. This is because the possibility of any unwanted incidents to be occur are at the minimum level and the will an adequate plan or procedure to be followed in case of an emergency(Beevis, 2003).

iii. Increase Quality of Work

The people are more comfortable in this environment that they can use their maximum potential to carry out certain task which will eventually give an output of a better quality. This also helps one to improve their potential and ability to give a better output and improve themselves as the work gives them self-satisfaction(Beevis, 2003).

iv. Better Engagement of People

As the environment is comfortable and safety, it gives a person to be more involved in the task as they do not experience any discomfort that lead to them to be tired or fatigue easier. A good tools and facilities management also gives them the confidence to carry out certain task according with full focus(Fernandes et al., 2015).

2.4 Facilities with Ergonomic Aspect

Facility is tools or equipment that is design and build to serve certain purpose in our daily life. There are different types of facilities such as transportation, sports, education, hospital, working place and school facilities (H. Kamarudin, Muhamad Ariff, Wan Ismail, Bakri, & Ithnin, 2014). The facilities provide has to take in consideration the ergonomic aspect so that the facilities provided are in convenient and comfortable to be used by respective people. It is important that the facilities provided makes ones task to be executed easily and does not bring any negative effects on them.

For example, a simple facility that is provided in most places is chairs. It is important that the chair is design at average height that suits both tall and short person so that they does not experience any discomfort or pain from siting on the chair. This aspect must be taken in consideration while design all types of facilities in all the places (Gouvali & Boudolos, 2006).

2.4.1 Facilities for Disable People

Disable people should be given equal importance while designing facilities for public places. According to the Malaysian Standard Codes of Practice for Disabled Persons (MS), it is compulsory to consider people with disabilities while providing facilities for public use such as special seating in public transport, different restroom, walk way and so on (MS:1331, 2003). The awareness to issues has given increasing in this era but not in all the places and fields. There is still lack of facilities for disable people in rural areas in compare with urban facilities.

In common, facilities provide at public places should be safe for all. This is one of the main ergonomic aspects for all kind of facilities. Sometimes, people with disabilities are tend to be ignore while construction certain facilities for public benefits. For example, a street light in midway of a walkway may provide sufficient amount of lighting for its pedestrians but might be difficult or an obstacle for person with physical barrier such as a wheel-chair user (Hikmah Kamarudin, Hashim, Mahmood, Ariff, & Ismail, 2012). This type of issues must be taken in consideration while designing these facilities in order to makes the life of a disable person easy as well.

2.4.2 Special Education School Facilities with Ergonomic Aspect

The facilities provide not only in normal school but also in Special Education School must take in consideration the ergonomic aspect in order to provide a safe learning environment for all the students according to the student's needs (Jayaratne, 2012) (Kim

& Lee, 2016). Ergonomic does not stop in classroom only but also all the other facilities in the schools. Some of the main facility areas where ergonomic aspect must be given important are as follow (Shalini a/p Sanmargaraja 2011) (Ibrahim, Osman, Bachok, & Mohamed, 2016):

- i. Classroom
- ii. Library
- iii. Canteen
- iv. Walkway / Floor
- v. Washroom
- vi. Sports room/ Field

Furniture such as table and chairs are one of the main facilities that are provided in most of the area state above. It is important that the chair and desk are design according to anthropometry of the students as it should be suitable for both tall and short or thin and big students (Oyewole, Haight, & Freivalds, 2010). This is important in order to avoid any musculoskeletal disorder (MSDs) problem among students. MSDs are injures or pain at any muscles and joints of an individual due to improper sitting or standing position (Dennerlein, 2017).



Figure 2.7: Chair and Desk of Anthropometry Design (Purnomo, 2016)

Lighting and air ventilation is also an important ergonomic aspects. All the enclosed area in the school such as classroom, library and so on must have sufficient lighting and adequate ventilation system installed. This is important in order for the student to have a comfortable learning environment. A proper would avoid glare and difficulties of seeing whiteboard in the class. Air ventilation is important that all the students do not experience any breathing problem. Improper ventilation system can cause nausea, drowsiness, lack of concentration and tiredness (Elearn, 2009).



Figure 2.8: Adequate Lighting & Ventilation

Walkway and floor on the school should be design by considering the students need such as it should be suitable for wheelchair users. The floor should obstacles free and not slippery to avoid students from falling. The walkway has hand handle at appropriate places so that it makes it easier for the student to move from one place to another (Legg, 2007).



Figure 2.9: Walkway with Ergonomic Aspect

The sports facilities provide in the special education school should be appropriate with the standard for disable student and not the mainstream students. These special

students also should be given equal opportunity to participate in extra-curricular activities and all the necessary equipment for that must be provided in the school. The field or playground should be maintained for its ergonomics aspect in order to maintain the safety of the students (Sit, McManus, McKenzie, & Lian, 2007)

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CHAPTER 3: METHODOLOGY

In this chapter, the methodology of the project will be discussed. The first part of the chapter will be on project planning, followed by premise selection, sample size, instrumentation used and data collection process.

3.1 Project Planning

The project planning starts by identifying the problem statement of the project in order to have an effective plan to complete the project on time with desire output. The Literature Review on the related topic was necessary to identify the gaps in the research topic and to determine the appropriate method for data collection and analysis. The objective and scope of the project was determined after identifying the gaps of the study.

This project required to get permission from the Ministry of Education Malaysia which is “Kementerian Pendidikan Malaysia (KPM)” before the visit to special education school to be done. Therefore, a copy of project proposal attached to the official letter from Supervisor was sent to request permission. The project will focus on the ergonomic facilities provided in the Special Education School and the importance of having those facilities. Figure 3.1 below above shows the overall project planning in a flow chart form.

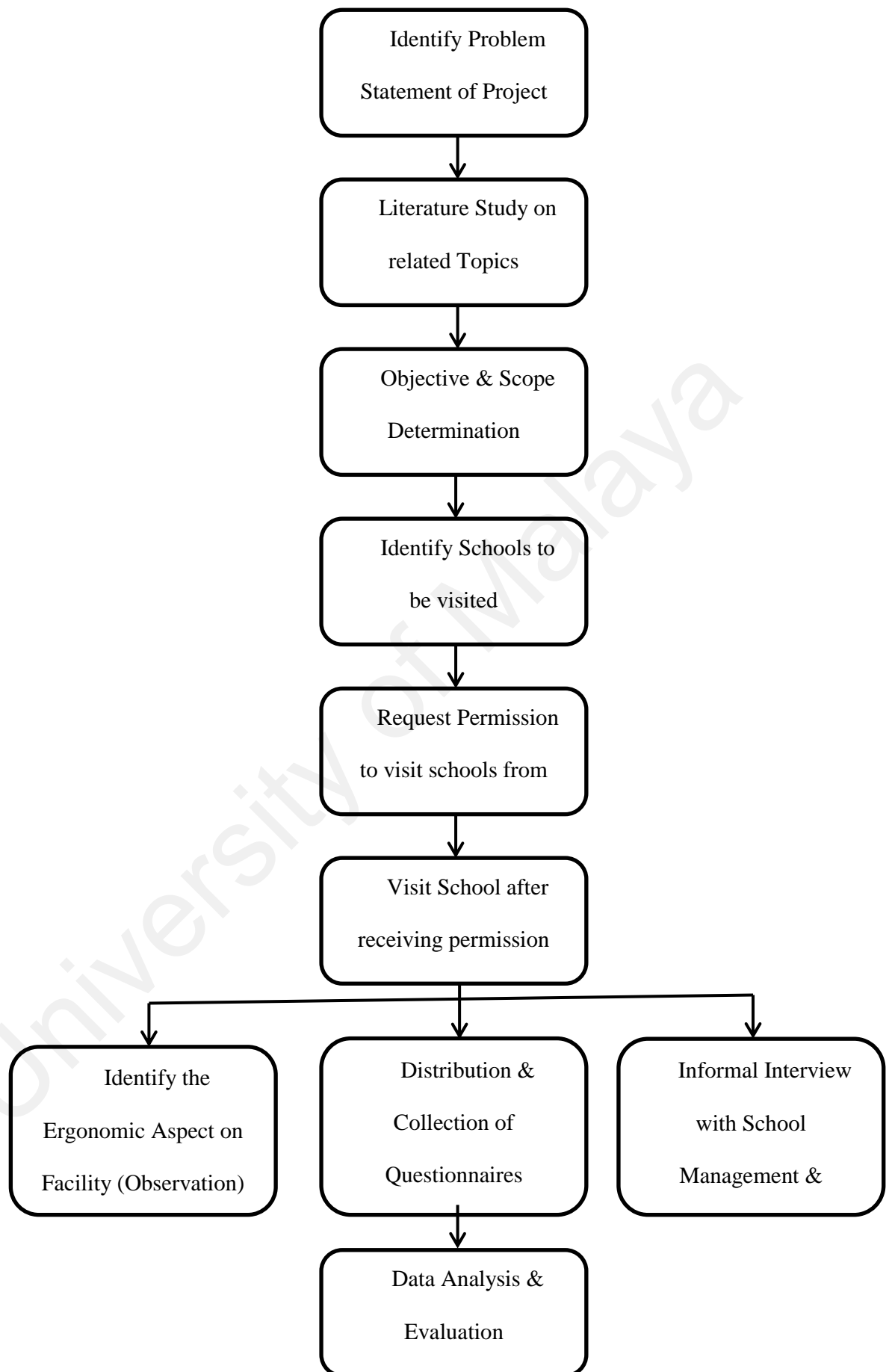


Figure 3.1: Flow Chart of Project Planning

3.2 School Selection

The schools to be visited for the project have been determined by taking in consideration the type of disability among their students. The Special Education Schools finalized for the visit were of all categories of Special Education School such as learning disability, hearing disability and vision disability. All the schools involved are around Klang Valley area. The project involves only government primary schools as premise to be visited and for data collection. Private, secondary and vocational schools were not involved in the data collection process.

Before the school visit was done, permission to visit those schools was obtained from the appropriate government managements such as Kementerian Pelajaran Malaysia (KPM) and Bahagian Pendidikan Khas (BPK). The Special Education Schools according to their category that involved in this research project are as the table below:

Table 3.1: List of Special education school

Name	Category
Sekolah Kebangsaan Pendidikan Khas Puchong Utama 1	Learning Disability
Sekolah Kebangsaan Putrajaya Presint 9(2)	Learning Disability
Sekolah Kebangsaan Pendidikan Khas Selangor	Hearing Disability
Sekolah Kebangsaan Pendidikan Khas Jalan Peel (P)	Hearing Disability
Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)	Vision Disability

The duration of the visit for each school was schedule according to the permission obtained from KPM which was from 23 August 2017 to 30 November 2017. Therefore the visits to the school were schedule in the duration of two and a half months which was from early September to mid-November. Each of the school was visited

twice on the date preferred by the school management. In the first visit, it was more of informal interview and knowledge sharing with the management and teachers follows by distribution of questionnaire. The questionnaire was collected back on the second visit which was approximately 2 weeks after the first visit. This is in order to give respondents to have enough time to complete the questionnaire and to have more accurate results. Visit around the school for observation on the facilities provided around the school were done both first and second visit to the school according to their convenience.

3.3 Sample Selection

In this project, samples involve are school management, teachers and student assistants (non-academic staff). The parents and student were not involved in the project research. Student and parents was not involved as samples in this research because the project was regarding the facilities provided in the school and the result obtain from teachers and staffs are believed to be more accurate as they know better about their school. The sample size of this research is 50 respondents in total. A large sample size was not used due to the limitation of teachers and staff in Special education school but it was not a very small sample size either so that it does not affect the result to be obtained from them.

3.4 Data Collection

Data and the information that will be presented in next chapter were obtained through several methods which are by observation, questionnaire distribution and informal interviews during the school visit.

3.4.1 Observation

The observation was done during the visit to each school. The school management allows to see around the school to know better regarding the facilities

provided in the school and the implementation of ergonomic facilities in the school compound. There was also a representative from the school followed together during the visit section around the school in order to explain in detail regarding the facilities and the importance of those facilities to the student or how it helps the students in the school live making it a comfortable environment. Some schools even give permission to take pictures of the school environment and any facilities that are related to the research project which can be made as evidence for the result obtain. Some schools do not allow any pictures to be taken in school compound for confidential purposes. The identities of the students from all the schools remain private and confidential.

3.4.2 Questionnaire

The questionnaire was distributed in the school among the school management, teachers and student assistants (non-academic staff). There were 10 respondents from each school which makes a total of 50 respondents involved in this project. The questionnaire was distributed almost equally among the Management, teachers and student assistants with a ratio of 2:6:2 people. This ratio was not fixed for all school as there were slight changes in some school due to insufficient number of required category respondent available during that time.

3.4.3 Informal Interview

Informal interview was more of an information sharing section with the school management and teachers of the schools respectively. There were appointed teachers who shared general information regarding the school on the first day of the visit while the project briefing section. They also share related information to the project such as what are types of facilities and services provided in the school. They also brief on how this facilities are being used to improve student's potential and to create a comfortable and safe surrounding for all the students.

3.5 Instrumentation

The instrumentation used in this research is questionnaire. The questionnaire contains 3 parts which are Part A, Part B and Part C which contain different types of questions respectively. The questionnaire was design in such way that the result to be received from it can be used as a part to achieve the objective set. The questionnaire was set and given to be verified by supervisor of the project before distributing it in the schools. This questionnaire was also sent to the KPM while requesting permission to visit the stated schools to get approval.

Part A of the questionnaire is regarding the general information of the respondents. This section was design in order to know the background of the respondents. Some of the information obtained from this section of the questionnaire are gender, age, position and education qualification. This was to know if the opinion of respondent differs according to their working position.

Part B of the questionnaire was to identify if the facilities provided in the school have taken in consider the ergonomic aspects. This section consist closed ended multiple choice statement where the respondent was allowed to choose to agree or disagree with the statement. The respondent was given four choices and requested to tick the prefer answer according to their opinion. The figure below shows the one example from this part of the questionnaire.

There is sufficient amount of lighting in the classroom.

Pencahayaan di dalam bilik darjah adalah pada tahap yang cukup.

Strongly
Agree
Sangat
Setuju

Agree
Setuju

Disagree
Tidak
Setuju

Strongly
Disagree
Sangat
Tidak
Setuju

Figure 3.2: Example from Questionnaire

Part C of the questionnaire was design with the aim to know the importance of the ergonomic facilities provided in the school in which it consist 4 open-ended questions. The reason for the open-ended question is to know in detail the respondents opinion which can help to gain more related information for the project. This section will provide information on how the facilities in the school affect their student's achievement and behavioral changes in them. Furthermore, the advantages of ergonomics facilities provided in the school to the teachers where to what extent this facilities can help them carry out their daily work can also be obtain through this section of the questionnaire.

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CHAPTER 4: RESULTS AND DISCUSSION

In this chapter, the result of the project will be discussed. The result of this project is obtain through the school visit and all the information to be discuss in this part are from school management, teacher and staffs of the special education school that has been visited.

4.1 Respondents Background

The respondents involved in this research are 50 responses from special education school consist of management, teachers and staffs. The students and parents were excluded from the process of data collecting for this project as the information from the school is believe to be more reliable. There were 5 special education schools around Klang Valley involved in this research project. The table below shows the number of respondents from each school respectively according to their gender and position.

Table 4.1: Respondents Information

SPECIAL EDUCATION SCHOOL	GENDER		POSITION		
	Male	Female	Management	Teacher	Staff
Sekolah Kebangsaan Pendidikan Khas Puchong Utama 1	1	9	2	6	2
Sekolah Kebangsaan Putrajaya Presint 9(2)	0	10	1	7	2
Sekolah Kebangsaan Pendidikan Khas Selangor	2	8	2	6	2
Sekolah Kebangsaan Pendidikan Khas Jalan Peel (P)	4	6	3	5	2
Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)	4	6	1	7	2
TOTAL	11	39	9	31	10

From the total of 50 respondents only 11 were male respondents and the rest 39 was female respondents which is more than double in compare with male respondents

but it will not affect the accuracy of the result. This is because the personal characteristic of respondents will not influence the data result of the questionnaire.

The respondents according to their position were taken in consideration to be at a ratio of 2:6:2 people for management, teachers and staffs respectively. As shown in the Table 4.1, there were 9 management, 31 teachers and 10 non-academic staffs who are student assistants as respondents. This gives a ratio of 1.8:6.5:2 which were very close to the fixed ration value. This ratio value was fixed by taking in consideration the total amount of staffs and their position in special education schools that has been visited. The position of the respondent was taken in consideration as the information that will be provided by respondents for Part C of the questionnaire which is on importance of ergonomic aspect on facilities in school will not be the same. This is because the knowledge and experience regarding the changes in the students will not be same between management, teachers and student assistants as they will have their own point of view on the students. Therefore, to get information from every point of view this ration of respondents was fixed.

4.2 Ergonomic Facilities

There were many facilities provided in all the special education school that has been visited according to their student's need. Part B of the questionnaire distributed in all school discussed about the ergonomic facilities provided around the school. The Table 4.2 below describes the some of the main facilities provided in the school that has been taken in investigated to identify whether the ergonomic aspect is taken in consideration.

Table 4.2: Outline of Ergonomics Facilities

FACILITY CATEGORY	DESCRIPTION
School Environment	Facilities in the school has taken ergonomic aspect in consideration
Classroom Condition	Roof, floor, walls are at good condition to maintain comfort and safety
Lighting of classroom	There are sufficient amount of light in the classroom
Ventilation and Temperature	Air ventilation and the temperature of classroom is maintain at optimum temperature
Furniture (chair/ desk)	The chairs and desk are suitable for all students with respect to their body size and in good condition
Medical Facilities	Adequate first aid is available at all time
Basic Necessity (Canteen, Washroom, Walkway)	It is design so that it is suitable for wheelchair user, vision deficiency students accordingly to the student's special needs.
Library	Environment in library is comfortable and safe with proper learning materials.
Sports Facilities	Special sports equipment and training are provided to the students

These facilities was selected by referring to Shalini a/p Sanmargaraja in journal “Kajian Penyediaan Fasiliti Kurang Upaya” , in which it has been stated tha these are some of the main facilities that must be taken in consideration to be provided for usage of disable people in any public places. Furthermore, according to Ibrahim, Osman, Bachok, & Mohamed, these are also facilities that must has specific standard and

guideline that should be taken in consideration while providing it schools in previous study in publics schools around Gombak district.

4.2.1 Result of Questionnaire Data

All the data presented in this section are obtained through the questionnaires results from the respondents. Respondent's opinion on the ergonomic aspects on the facilities provided in their school will be presented in this section. The respondents were given four options for each question in this part of the questionnaire to give their level of acceptances to the presences of ergonomic aspect on the facilities provided in the school.

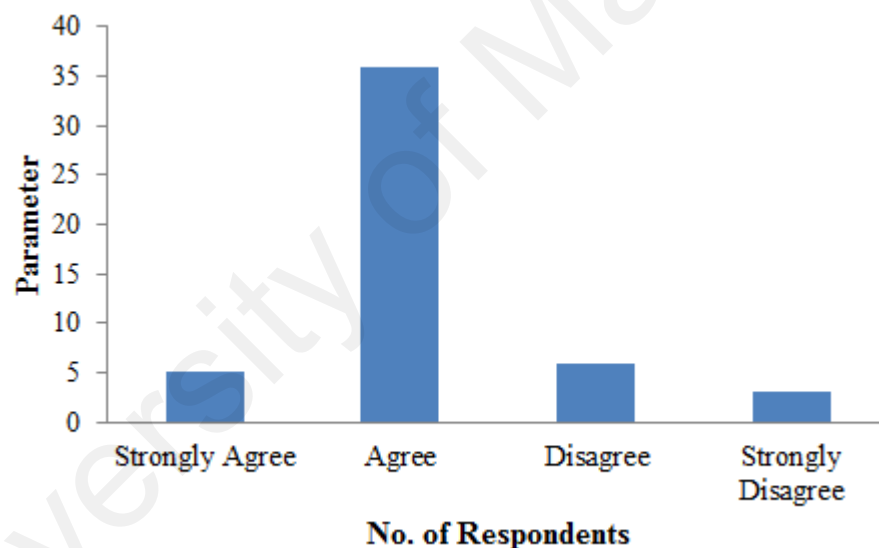


Figure 4.1: Facilities of Ergonomics Aspect

Figure 4.1 above shows that there 5 of them out of 50 who strongly agree that the schools environment are of ergonomic aspect in where the facilities provided has also taken in consideration ergonomic aspects and 36 of the respondent agree to this statement. Only a small number out of all the respondents disagree to the statement which were 9 of them where 6 who disagree and 3 strongly disagree. Table 4.3 below

shows the exact number of the respondent's level of acceptance to the statement according to their position.

Table 4.3: Response on Facilities of Ergonomics Aspect

Parameter	Position			Number of Respondents
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	4		5
Agree	7	21	8	36
Disagree	1	4	1	6
Strongly Disagree		2	1	3
TOTAL				50

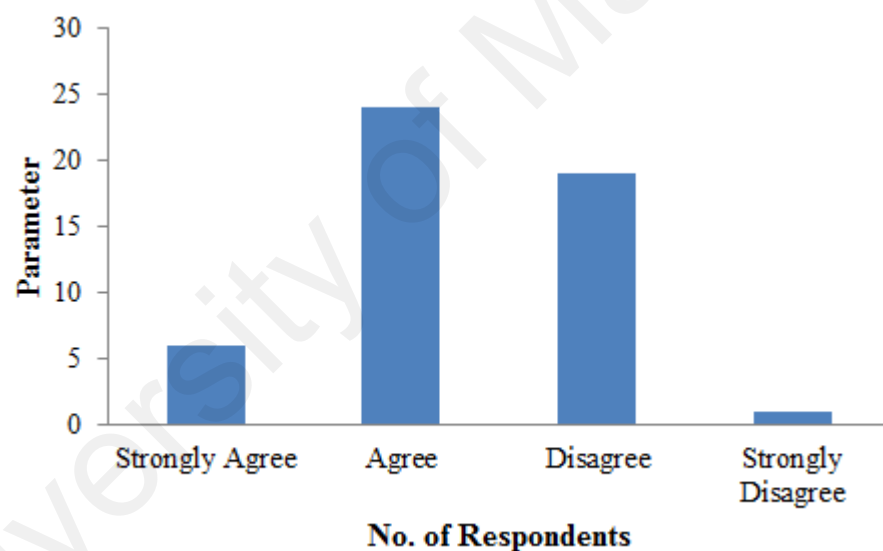


Figure 4.2: Response on Classroom Condition

Figure 4.2 above shows that there are number of respondent accept that the classrooms are of ergonomic aspect is more than the number of respondent disagreeing to the condition. The total number of respondents accepts the statement is 30 where 6 who strongly agree and 24 of them agree respectively. The Table 4.4 below shows in detail the number of respondents to the classroom condition according to their position.

Table 4.4: Response on Classroom Condition According to Position

Parameter	Position			Number of Respondents
	Management	Teacher	Non-Academic Staff	
Strongly Agree	2	4	0	6
Agree	4	14	6	24
Disagree	3	12	4	19
Strongly Disagree	0	1	0	1
TOTAL				50

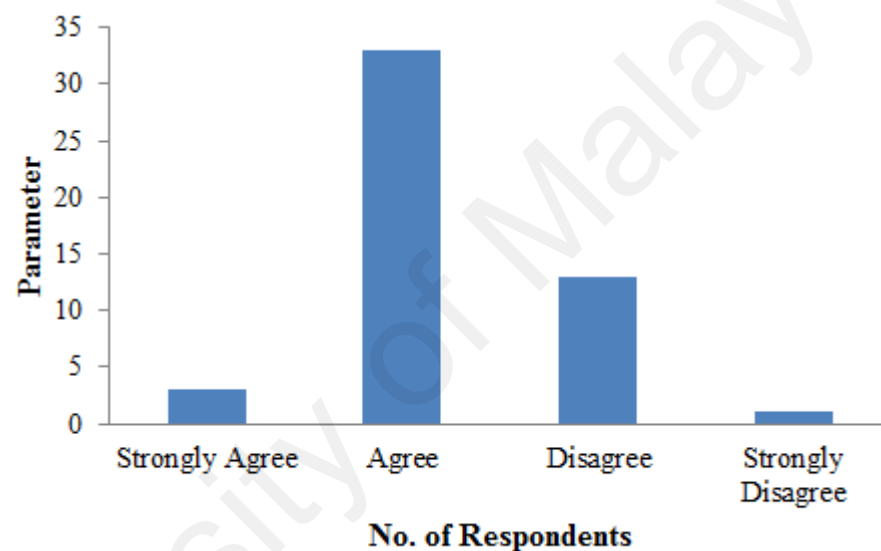


Figure 4.3: Response on Lighting

From the response, it can be seen that the lighting of the classroom has been taken in consideration for its ergonomics aspect where there were sufficient and proper lighting provided in the classrooms. This is because from the Figure 4.3 above, it can be seen that there are large number of respondents who agree that sufficient amount of lighting were provided in the classrooms which are 3 and 33 respondents for strongly agree and agree respectively in compare with the number of respondent who does not agree to the statement which are only 13 for disagree and 1 strongly disagree respondents only. Table 4.5 below shows the exact number of respondent for each category of responses according to their position in the school.

Table 4.5: Response on Lighting According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	2	0	3
Agree	6	18	9	33
Disagree	2	11	0	13
Strongly Disagree	0	0	1	1
TOTAL				50

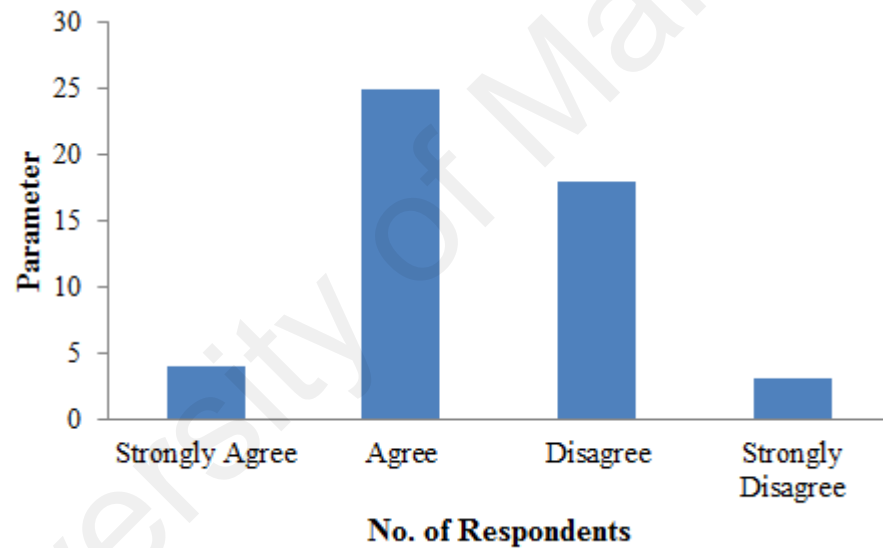


Figure 4.4: Response on Temperature and Ventilation

Table 4.6: Response on Temperature and Ventilation According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	3	0	4
Agree	5	15	5	25
Disagree	3	11	4	18
Strongly Disagree	0	3	0	3
TOTAL				50

Figure 4.4 and Table 4.6 shows the responses on the temperature and ventilation of classrooms of the school. The respondent who accept there is enough ventilation and the temperature is always maintain at optimum level are 29 respondents where 4 of them strongly agree and 25 of them agree to the condition.

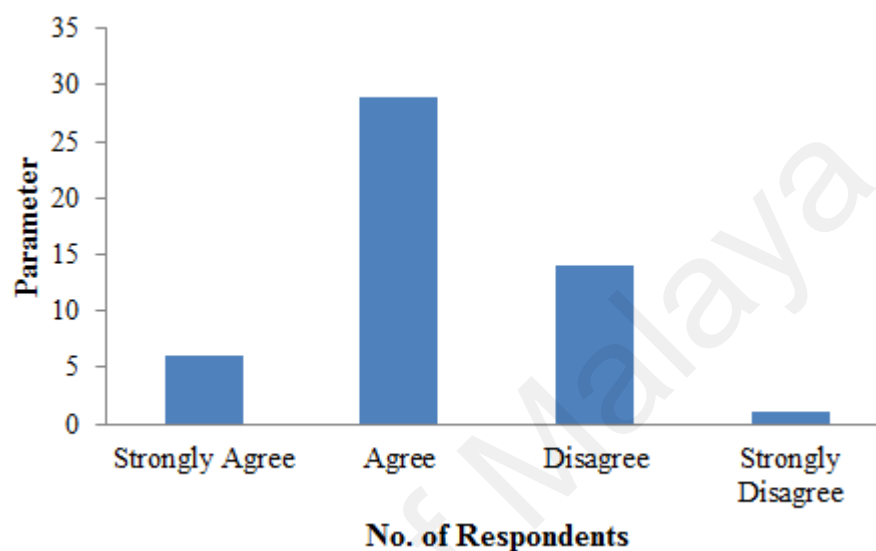


Figure 4.5: Response on Furniture

Table 4.7: Response on Furniture According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	4	1	6
Agree	6	16	7	29
Disagree	2	11	1	14
Strongly Disagree	0	0	1	1
TOTAL				50

The Figure 4.5 shows the response of the respondent on furniture such as table, desk, and whiteboard and so on provided in their school. The number of respondents who strongly agree and agree that they have adequate furniture for their student are 6 and 29 of them respectively. There are 20 out of 31 teachers accept that they provide proper furniture whereas only 11 disagree with the statement and none state that they strongly

disagree. The Table 4.7 above shows all the response according to the respondent position in their school.

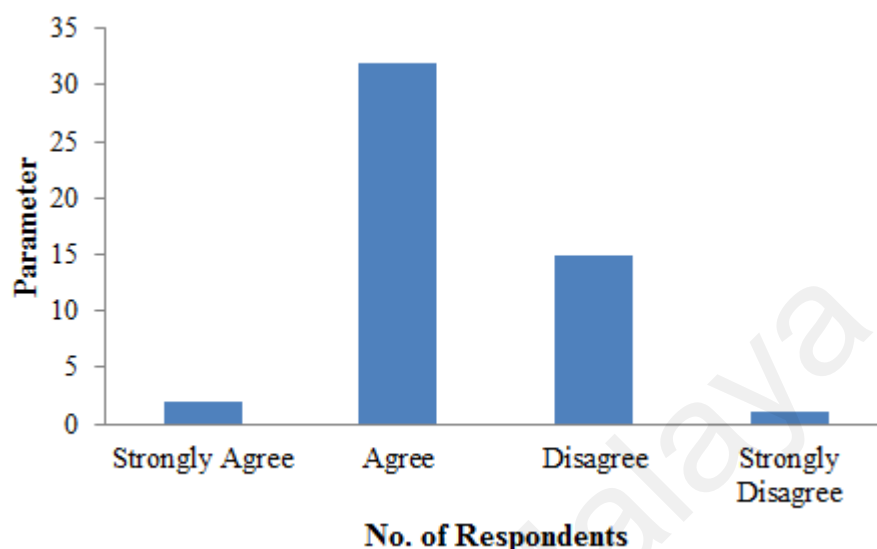


Figure 4.6: Response on Medical Aid

Table 4.8: Response on Medical Aid According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	1	0	2
Agree	5	18	9	32
Disagree	3	11	1	15
Strongly Disagree	0	1	0	1
TOTAL				50

Figure 4.6 and Table 4.8 show that majority of the respondents agreed that their school have adequate medical aid provided in their school. There are in total 2 of them who strongly agree and 32 of the respondent who agreed that there are proper medication facilities available in case of emergency.

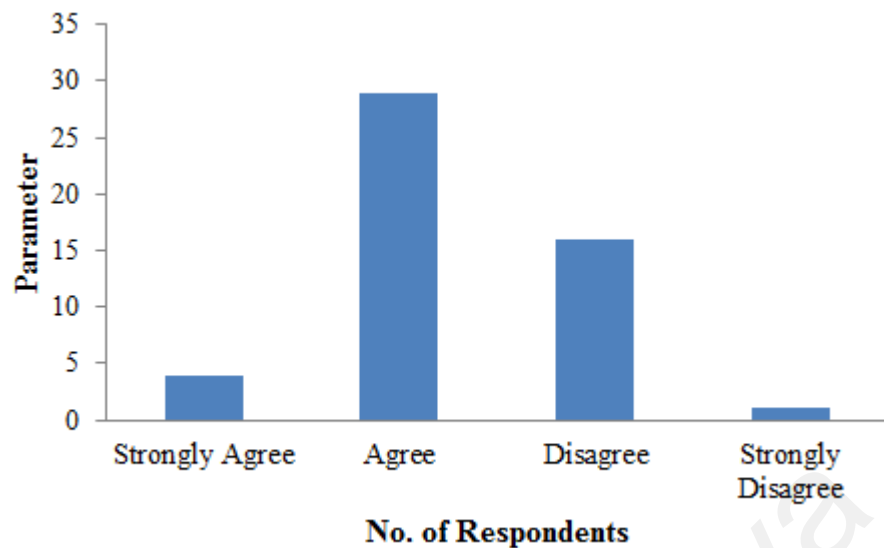


Figure 4.7: Response on Basic Necessity of Students

Table 4.9: Response on Basic Necessity of Students According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	3	0	4
Agree	6	16	7	29
Disagree	2	12	2	16
Strongly Disagree	0	0	1	1
TOTAL				50

Figure 4.7 and Table 4.9 shows the response on the basic necessity provided in the school such as canteen, washroom and walkway provide are of ergonomic aspect which will convenient for all the students. There are 4 of them strongly agree and 29 of them agree to this.

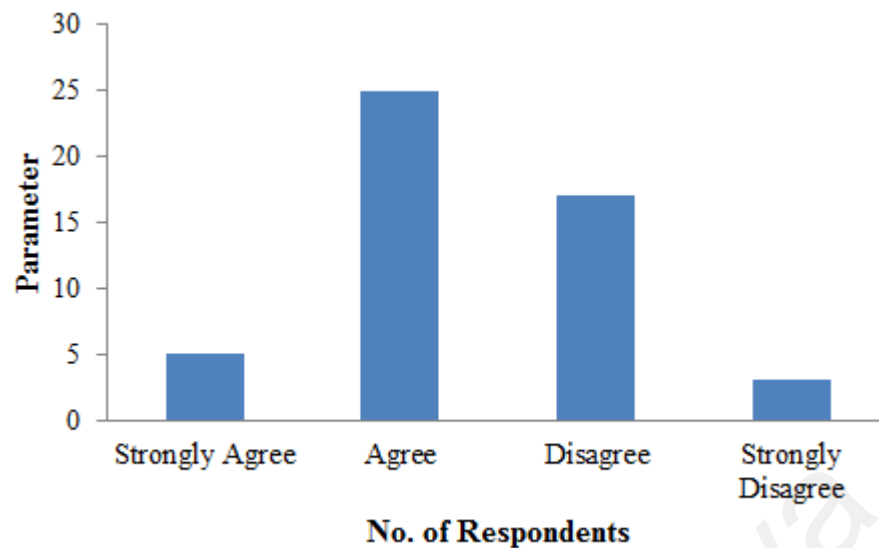


Figure 4.8: Response on Library Facilities

Table 4.10: Response on Library Facilities According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	3	1	5
Agree	5	16	4	25
Disagree	3	10	4	17
Strongly Disagree	0	2	1	3
TOTAL				50

From the result obtain that can be seen through Figure 4.8 and Table 4.10, it can be seen that there are proper library facilities provided in the school as there are more respondent accept to this in compare with the one who deny it. Out of 50 respondents, 5 of them strongly agree and 25 of them agree to the statement whereas only 20 of them feel there is no sufficient library facilities with 17 who disagree and 3 who strongly disagree.

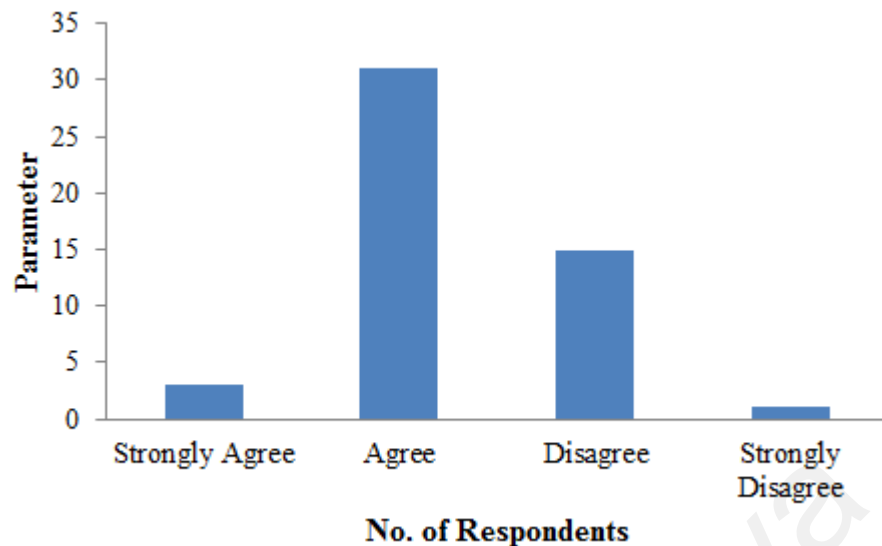


Figure 4.9: Response on Sports Facilities

Figure 4.11: Response on Sports Facilities According to Position

Parameter	Position			Number of Respondent
	Management	Teacher	Non-Academic Staff	
Strongly Agree	1	2	0	3
Agree	6	18	7	31
Disagree	2	11	2	15
Strongly Disagree	0	0	1	1
TOTAL				50

Response on the sport facilities in the school are shown in the Figure 4.9 and Table 4.11. The numbers of respondent strongly agree to this are 3 of them and 31 of them who agree whereas only 1 of the respondent strongly disagree to the statement.

Besides that, there were special facilities provided in the special education schools according to their students need such as sensory room, cooking room, braille facility, computer room and so on. These facilities will be discussed in detail in the next section of this chapter.

Overall it has been identify from data obtain through questionnaire result that there are different categories of ergonomic facilities have been provided in the Special Education School. It can be seen that there are more respondents who strongly agree and agree that there are presence of ergonomic facilities for all category in compare with the number of the respondent who disagree the same statement.

4.2.2 Result of Observation in Special education school

This section of the chapter will be the discussion on the ergonomics aspect of the facilities provided in the special education school as a result of observation during the visit. As stated in previous section some of the special facilities provided in specific special education school will also be discuss in this section.



Figure 4.10: Walkway of Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)

The walkway was design with a hand railing along. This creates an easier condition for the student with vision deficiency to walk on the walkway with more convinient

way as the hand railing acts as support for them. Moreover the walkway has a straight and non-slippery ground to avoid the student from tripping or falling down. Hikmah Kamarudin, Hashim, Mahmood, Ariff, & Ismail has stated in the previous research that the walkway must be obstacles free in order to be safe and convenient for a person with physical barrier.



Figure 4.11: Tables of Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)

The table are of “L” shape which is ergonomically suitable for students with vision deficiency. This type of table create a more convenient ways for the student to used it in compare with the normal design table that is being used in normal schools.



Figure 4.12: Chairs and Tables of different size in Special Education Schools

The chairs provided in the classroom are of different heights in order to ensure that the chair is suitable for the students according to their body size. The students which have a higher growth rate or in a bigger body size can use the higher chair. According to Oyewole, Haight, & Freivalds in previous studies, it has been stated that the furniture provided in the school must be suitable with the student body size. This is to make sure that the student does not experience any back pain caused by the furniture and to maintain the comfort level of the student during the class hours. Gouvali & Boudolos has stated that furniture provided in the school must be suitable with the students' anthropometry measurement.



Figure 4.13: Steps of Special

The steps of the special education schools are out of obstacle and with handrailin through out. This is important for the students safety and to avoid any unwante incident that can cause injuries to their students.



Figure 4.14: Lighting And Ventilation in Special education schools

The Figure 4.14 above show that the lighting and ventilation system of special schhols are amintain for its ergonomics aspects. There are enough number of lights in a room and the lights are arrange in such position that the entire room receive the lighting. The arrangement of the lights was taken in consideration nott to be concentrate only at the centre of the room or back of the room. Moreover there is also proper ventilation system installed in the rooms. Its either there was enough number of fan and window in a room or if its and eclosed room there is air conditioner provided to maintain the

temperature and air circulation at an optimum level all the time. According to Elearn in previous study it is important to have a proper ventilation system installed in order to avoid tiredness,nausea and drowzniness while in a enclosed space.



Figure 4.15: Library in Special education schools

Library equipped with adequate facilities and appropriate learning materials were provided in all the special education schools that has been visit. The environment of the library was maintain at comfortable and convenient state all the time in order to create a efficiency learning surrounding for the students. According to Legg, 2007 in the study of ergonomic in schools states that the library provided in school must be suitable to the

students need and in a convenient condition which goes along with the observation result obtain.



Figure 4.16: Braille in Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)



Figure 4.17: Cooking Room in Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)

Figure 4.16 and Figure 4.17 shows some of the special facilities provided in Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B). Braille is provided to all the students in the school for their curricular purposes. There were sufficient number of braille in the school all the time to ensure that all the student does not miss any lesson as it is the main equipment for them in writing. Besides that, there was cooking room was provided as one extra-curricular activity the for the students to enhance their other skills besides formal education.



Figure 4.18 : Sensory Room in Special School with Learning Disabilities

Sensory room as shown in Figure 4.18 was provided in special education schools with learning disability a student that were visited which is Sekolah Kebangsaan Pendidikan Khas Puchong Utama 1 and Sekolah Kebangsaan Putrajaya Presint 9(2). The purpose of the sensory room is to help the student to be more focus by creating a relaxing environment. The sensory room also helps the student improve the communication and mobility strength together with increasing their creative sensory.

4.3 Importance of Ergonomic Aspect on Facilities

Information presented in this part of the result was obtained through the questionnaire data and informal interview with the school management and teacher

during the visit. The information obtained through the questionnaire for each question in Part C was divided into several themes depending on the types of response received which was described in detail accordingly later.

4.3.1 Importance of Considering Ergonomic Aspect on Facility Provided

From all the responses obtain on the importance of providing facilities with ergonomic aspects it can be divided into three main themes as Table 4.12 and Figure 4.19:

Table 4.12: Importance of Considering Ergonomic Aspect on Facility Provided

Respondent's Position	Theme of Response		
	Comfort	Teaching & Learning	Safety
Management	4	2	3
Teacher	10	14	7
Non- Academic Staff	5	1	4
TOTAL	19	17	14

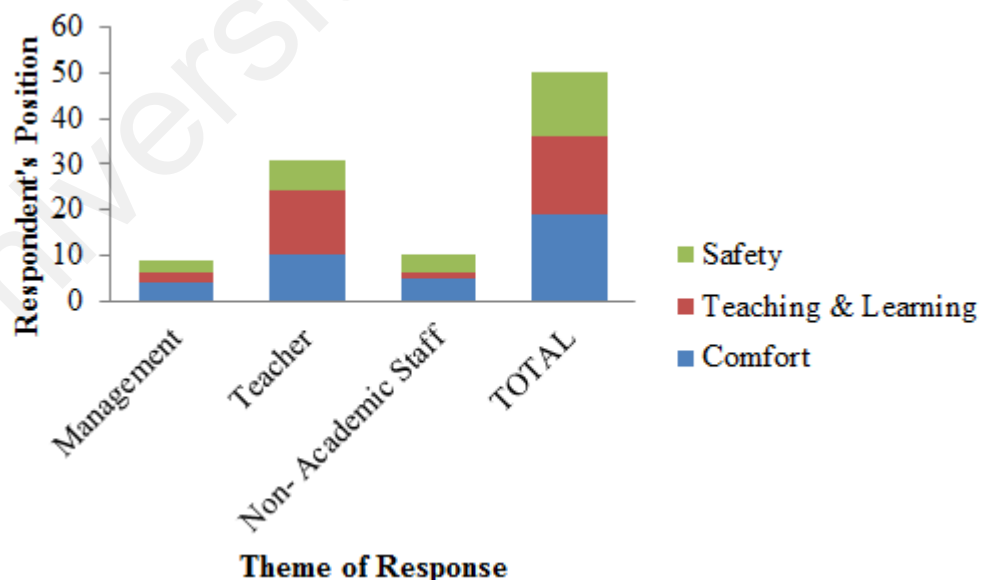


Figure 4.19: Importance of Considering Ergonomic Aspect on Facility Provided

i. Safety

Respondent of all position has stated that ergonomic facilities are important in order to build a safe school environment. It includes the avoidance of accidents and injuries among the students. Furthermore, it has also been states that the facilities with ergonomic aspect are safer to be used by the students in their daily school routine. This also go along with study by Jayaratne on “Ergonomic Consideration in School Environment” which has stated that one of the ergonomic advantages is create a safe environment in workplace.

ii. Conducive Environment

A large number of respondents expressed that ergonomic facilities helps to maintain a conducive environment for the students with special needs. The facilities are likely to be more suitable for specific student and create a comfortable surrounding for the all students. It also has been stated that these facilities develop a harmonious situation for the student to interact and work with each other. According to Beevis in 2003 study on “Ergonomic - cost and benefits”, it has been stated that ergonomics helps to provide an acceptable working environment.

iii. Learning and Teaching

Most of the teachers considered that the ergonomic facilities improve the learning and teaching, “*Pembelajaran dan Pengajaran (P&P)*”. They also express that the students tend to be comfortable during the class which makes the teaching become more effective and the quality of the students work has increase. There were a small number of management and staff stated the same.

4.3.2 Advantages for Students from Ergonomic Aspect Facility

The facilities with ergonomic aspect help the students in many ways. In this section, the feedback on to what extend these facilities helps the student in their daily routine

was obtained. The data obtain was divide into three main themes which are as shown in Table 4.13 and Figure 4.20.

Table 4.13: Advantages for Students from Ergonomic Aspect Facility

Respondent's Position	Theme of Response		
	Education Effectiveness	Student Focus	Self-Management
Management	6	2	1
Teacher	15	10	6
Non- Academic Staff	1	3	6
TOTAL	22	15	13

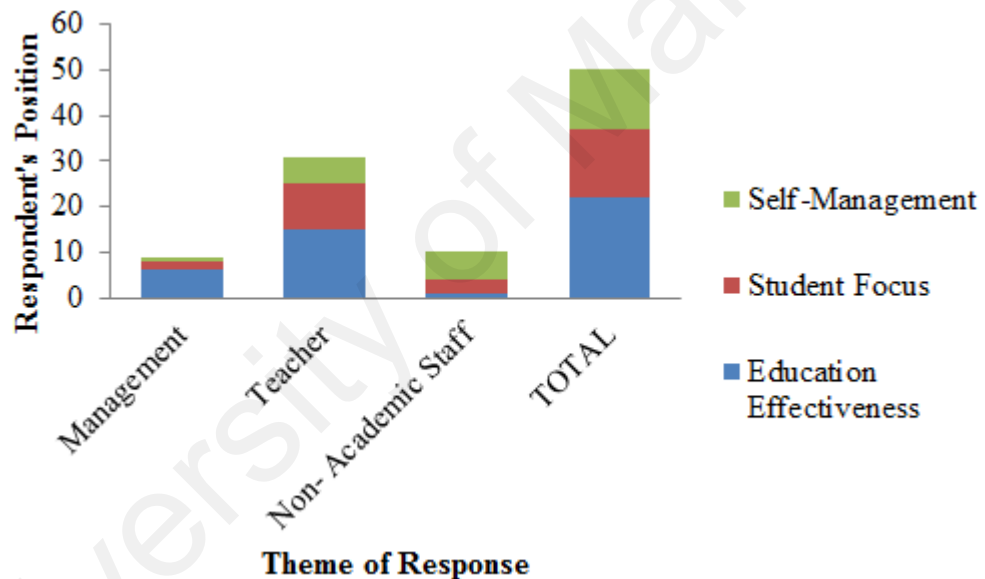


Figure 4.20: Advantages for Students from Ergonomic Aspect Facility

i. Education Effectiveness

Majority number of respondents in management stated out that the curricular and extra-curricular objective are achieved in the given time schedule. It has been reason out that the learning and teaching process has become effective by having ergonomically design facilities. Furthermore, there were also improvements in the student education achievement.

According to Kim & Lee in 2016 research on “The Effect of Accommodation on Academic Performance of College Students With Disabilities” it has been stated that the adequate facilities around the learning environment helps to improve their GPA. From this, it can be seen that the facilities helps to improve student’s education without regards to to their age and level of education.

ii. Self-Management

Most of the non-academic staff who are student assistants pointed out that the students tend to be more independent in doing the basic daily routines such as there is no need for them to accompany the student when they want to go to the washroom or guide them in the canteen. It has also been stated the there is no need to monitor the students all the time in class as they learn to do their task by own which eventually reduce ratio of student assistant for a specific group with a number of students.

iii. Student Focus

It has been express that the students stay more focus during the class hours and tend to concentrate in their studies well. They are less likely to be tired faster and remain active for a longer time. According to Fernandes et al., 2015, ergonomic management in workplace reduce the abtenism among the workers in which they are to be better engaged with their work. This concept is also practical in Special Education School.

4.3.3 Characteristic Changes in Students

This part in the questionnaire has received many different responses from the respondents. There were many kinds of characteristics and behavioral changes that has

been describe by respondents of all position. All the responses were analyzed carefully and have been divided in three main themes as Table 4.14 and Figure 4.21:

Table 4.14: Characteristic Changes in Students

Respondent's Position	Theme of Response		
	Emotion Improvement	Discipline Improvement	Self-Realization
Management	2	5	2
Teacher	19	8	4
Non- Academic Staff	7	2	1
TOTAL	28	15	7

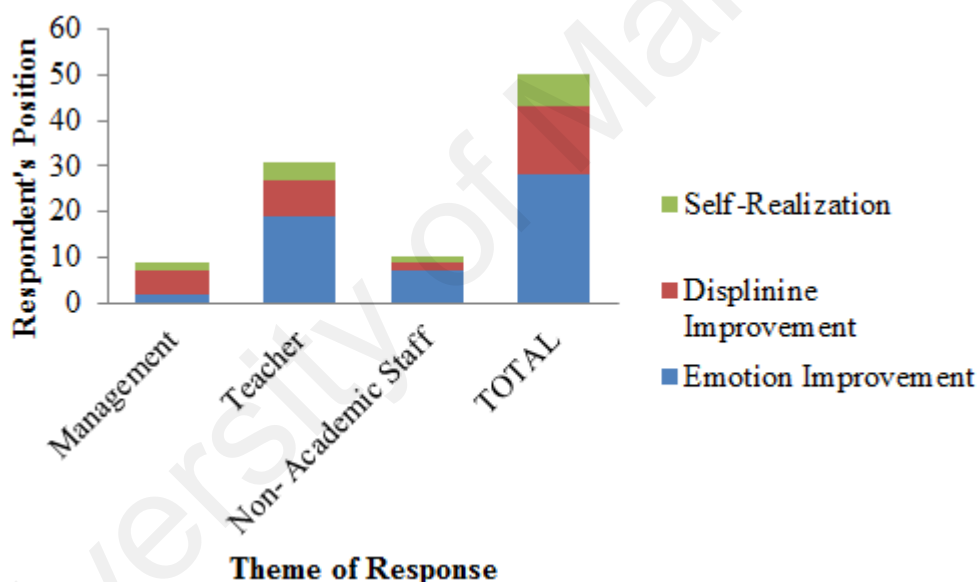


Figure 4.21: Characteristic Changes in Students

i. Disciplinary improvement

The disciplinary problems among the students have been reduces in where the students follow the rules without any problems. The attendance of the student also has been improved over the time due the comfortable environment created by facilities with ergonomic aspect.

ii. Self-Realization

There are also a small number of respondent stated the behavioural of the students tend to be positive in where they try to react in a good manner to a situation. It has also been described that the students also are being more focus in their studies and take it in a more serious way.

iii. Emotional Changes

Respondents from all position have opinion out that the students are tend to be happier and enjoy the learning environment. The students also are less likely to be aggressive and can be control in an easier manner.

4.3.4 Advantages for Teachers from Ergonomic Aspect Facility

There were more mush difference in the data received on to what extend does the facilities with ergonomic aspect help the teacher in their duty from the respondent of all position. They were more likely to response in the same manner on this topic which was divided into two main categories as Table 4.15 and Figure 4.22:

Table 4.15: Advantages for Teachers from Ergonomic Aspect Facility

Respondent's Position	Theme of Response	
	Working Result	Health
Management	6	3
Teacher	18	13
Non- Academic Staff	3	7
TOTAL	27	23



Figure 4.22: Advantages for Teachers from Ergonomic Aspect Facility

i. Working Result

Most of the respondents of management and teachers detailed out that it is easier, convenient and comfortable to conduct their work when the facilities provided taken in consideration the ergonomic aspect. Moreover, it has also been stated that the teaching process have been much effective which contributes to productive result from the students. It also been mention that the time taken to deliver knowledge to the student are faster as the student are in a comfortable environment that they adapt to new learning easier

ii. Health

The non-academic staff feels that the stress level due to the work can be reduce as it is easier to handle the student in an ergonomically design environment. The respondents also mention that the facilities with ergonomic aspects help to avoid health issues such as back pain, joint pain and so on or injuries due to the working environment. According to Elearn in 2009 on the study “Facilities management and ergonomics Managing Health, Safety and Working Environment”, it has been stated that ergonomic

facilities reduce the chances of health problem or injuries in workplace
which go along with the re
ceived response.

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CHAPTER 5: CONCLUSION

5.1 Conclusion

The ergonomic facilities provided in Special Education Schools have been identified through questionnaire responses and observation during the school visit. These identified facilities are in term of the condition of the classroom, lighting, ventilation and the furniture provided. The ergonomic facility identified also involves library, medical, sports facilities and other basic necessity which includes canteen, walkway and washroom of the Special Education School. The importance of providing facilities with ergonomic aspect has been evaluate from the response obtain from respondents who are management staff, teachers and non-academic staff of Special Education Schools. The importance evaluated was in term of the advantages that the gain trough ergonomic facilities and the behavioral and characteristic changes in the student due to these facilities in special education school. The evaluation also involves the advantage that the teachers gain by having ergonomic facility in their special education school. Some of the advantages that the students and teachers gain in Special Education Schools by having ergonomic facilities are same as the advantages of worker in ergonomic workplace. There are few recommendations that can be done on this project in future for enhancements of the project and to gain benefits from it.

5.2 Future Recommendation

There are potential of designing facilities with ergonomics for special education school that can be used as suggestions or a prototype in order to build it as real-time product that can be useful and enhance the quality of the special education school student's education lifestyle. This can also be part of support for the students of special education school to improve their achievement and to succeed in all fields.

Besides that, the future project can also include teachers and parent's suggestion on the type of facilities required by the student before developing new ergonomic design as stated above. This can be very helpful for the special students as these facilities designed from feedback will fill the requirement of the student appropriately.

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APPENDIX

Appendix A: Permission Letter from Kementerian Pendidikan Malaysia



KEMENTERIAN PENDIDIKAN MALAYSIA
MINISTRY OF EDUCATION MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
EDUCATIONAL PLANNING AND RESEARCH DIVISION
ARAS 1-4, BLOK EB
KOMPLEKS KERAJAAN PARCEL E
PUSAT Pentadbiran Kerajaan Persekutuan
62604 PUTRAJAYA



KEMENTERIAN
PENDIDIKAN
MALAYSIA

Telefon : 03-8884 6500
Faks : 03-8884 6439
Laman Web : www.moe.gov.my

Ruj. Kami : KPM 600-3/2/3 Jld 91 (47)

Tarikh : 14 Ogos 2017

Uma Mageswary A/P K.Munusamy
K.P.:920227146242

166-11-09 Rumah Pangsa Sentul Utara
51000 Kuala Lumpur
Wilayah Persekutuan Kuala Lumpur

Tuan,

KELULUSAN UNTUK MENJALANKAN KAJIAN DI SEKOLAH, INSTITUT PENDIDIKAN GURU, JABATAN PENDIDIKAN NEGERI DAN BAHAGIAN DI BAWAH KEMENTERIAN PENDIDIKAN MALAYSIA

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan.

"Pengajian Aspek Ergonomik bagi Kemudahan di Sekolah Khas Pelajar Istimewa"

3. Kelulusan ini adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada Bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengetua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari **23 Ogos 2017 hingga 30 November 2017**.

5. Tuan juga mesti menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat Pdf di dalam CD kepada Bahagian ini. Tuan diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DR ROSLI BIN ISMAIL)
Ketua Sektor
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia



Appendix B: Permission Letter from Bahagian Pendidikan Khas



KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PENDIDIKAN KHAS
ARAS 2, BLOK E2,
KOMPLEKS KERAJAAN PARCEL E
PUSAT Pentadbiran Kerajaan Persekutuan
62604 PUTRAJAYA

Tel.: 03-8884 9190
Faks: 03-8888 6659
Laman Web://www.moe.gov.my

BPK (Approval)
Original

Ruj. Kami : KPM.600-3/2/3 Jld. 53 (65)
Tarikh : 25 September 2017



Uma Mageswary A/P K. Munusamy
166-11-09 Rumah Pangsa Sentul Utara
51000 Kuala Lumpur

Puan,

**KELULUSAN MENJALANKAN KAJIAN PENGAJIAN ASPEK
ERGONOMIK BAGI KEMUDAHAN DI SEKOLAH KHAS PELAJAR
ISTIMEWA**

Dengan hormatnya surat bertarikh 23 Ogos 2017 dan surat kelulusan daripada Bahagian Perancangan dan Penyelidikan Dasar Pendidikan, No. Ruj.: KPM.600-3/2/3 Jld 51(67) adalah berkaitan.

2. Sukacita dimaklumkan bahawa Bahagian Pendidikan Khas (BPKhas), Kementerian Pendidikan Malaysia (KPM) tiada halangan untuk membenarkan puan menjalankan kajian bertajuk "**Pengajian Aspek Ergonomik bagi Kemudahan di Sekolah Khas Pelajar Istimewa**" di Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B), Kuala Lumpur; Sekolah Kebangsaan Pendidikan Khas Jalan Peel (P), Kuala Lumpur; dan Sekolah Kebangsaan Pendidikan Khas Selangor (P), Selangor.

3. Walau bagaimanapun, pihak kami mengingatkan puan supaya:

- i) tidak melibatkan murid-murid dari kelas yang menduduki peperiksaan dalam program yang dijalankan;

...2/-

KPM.600-3/2/3 Jld. 3 (65)

- ii) menjalankan aktiviti di luar waktu pengajaran dan pembelajaran (PdP); dan
- iii) tidak menyentuh perkara yang bertentangan dengan Dasar Pendidikan Negara serta isu-isu sensitif peribadi murid berkeperluan khas dan keluarga mereka.

4. Kelulusan untuk menjalankan kajian di Program Pendidikan Khas Integrasi (PPKI) atau Program Pendidikan Inklusif (PPI), **Sekolah Kebangsaan Putrajaya Presint 9 (2), Putrajaya** hendaklah mendapat kebenaran daripada **Pengarah Bahagian Pengurusan Sekolah Harian, Kementerian Pendidikan Malaysia**.

5. Surat kelulusan ini sah digunakan **sehingga 30 November 2017**.

6. Puan diharap dapat mengemukakan senaskhah laporan akhir/tesis berkenaan setelah kajian tersebut disiapkan untuk rujukan dan simpanan pihak kami.

Sekian, terima kasih.

"SEHATI SEJIWA"
"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,



(RUSNANI BINTI MOHD SIRIN)
Timbalan Pengarah (Perancangan dan Penilaian)
b.p. Ketua Setiausaha
Kementerian Pendidikan Malaysia

rusnani_binti_mohd_sirin_kempepd

Appendix C: Photos with Special education school Management



Sekolah Kebangsaan Pendidikan Khas Puchong Utama 1



Sekolah Kebangsaan Putrajaya Presint 9(2)



Sekolah Kebangsaan Pendidikan Khas Selangor



Sekolah Kebangsaan Pendidikan Khas Jalan Batu (B)



Sekolah Kebangsaan Pendidikan Khas Jalan Peel (P)

University of

Appendix D: Questionnaire

PART A: RESPONDEN BACKGROUND **BAHAGIAN A: LATAR BELAKNG RESPONDEN**

1. Gender :
Jantina
 Male
Lelaki
 Female
Perempuan
2. Age:
Umur
 21-30 31-40 41-50 50 &
Above
3. Posotion:
Jawatan
 Management
Pihak pengurus Teacher
Pengajar Non Akademik Staff
Pekerja Bukan
Akademik
4. Academic Qualification
Kelayakan Akademik
 PMR/
SPM Diploma Degree
Ijazah Master
Sarjana PHD

PART B: ERGONOMIK ASPECT OF FACILITIES **BAHAGIAN B: ASPEK ERGONOMIK PADA KEMUDAHAN**

1. The facilities provided in the school have taken in consideration the ergonomic aspect.
Kemudahan yang disediakan di sekolah telah mengambil kira aspek ergonomik.
 Strongly
Agree
Sangat
Setuju Disagree
Tidak
Setuju Strongly
Disagree
Sangat
Tidak
Setuju
2. The condition of the classroom (walls, roof, floor) is maintain for its attractiveness and comfortableness.
Bilik darjah (dinding, bumbung, lantai) adalh sentiasa dalam keadaan yang menarik dan selesa.
 Strongly
Agree
Sangat
Setuju Agree
Setuju Disagree
Tidak
Setuju Strongly
Disagree
Sangat
Tidak
Setuju

3. There is sufficient amount of lighting in the classroom.
Pencahayaannya di dalam bilik darjah adalah pada tahap yang cukup.
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Strongly Agree
Sangat Setuju | <input type="checkbox"/> Agree
Setuju | <input type="checkbox"/> Disagree
Tidak Setuju | <input type="checkbox"/> Strongly Disagree
Sangat Tidak Setuju |
|--|--|---|---|
4. The classroom is in the optimum temperature always.
Bilik darjah adalah sentiasa berada dalam suhu optimum
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Strongly Agree
Sangat Setuju | <input type="checkbox"/> Agree
Setuju | <input type="checkbox"/> Disagree
Tidak Setuju | <input type="checkbox"/> Strongly Disagree
Sangat Tidak Setuju |
|--|--|---|---|
5. There are sufficient amount of classroom facilities (tables, chair, whiteboard) available in good condition.
Kemudahan di dalam bilik darjah (meja, kerusi, papan tulis) adalah dalam quantity yang mencukupi dan keadaan yang baik.
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Strongly Agree
Sangat Setuju | <input type="checkbox"/> Agree
Setuju | <input type="checkbox"/> Disagree
Tidak Setuju | <input type="checkbox"/> Strongly Disagree
Sangat Tidak Setuju |
|--|--|---|---|
6. Adequate first aid and medical facilities are available in case of accident.
Bekalan pertolongan cemas dan kemudahan perubatan yang mencukupi boleh didapati sekiranya berlaku kemalangan.
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Strongly Agree
Sangat Setuju | <input type="checkbox"/> Agree
Setuju | <input type="checkbox"/> Disagree
Tidak Setuju | <input type="checkbox"/> Strongly Disagree
Sangat Tidak Setuju |
|--|--|---|---|
7. The necessity of the student (canteen, washroom, walkway) is provided as per the ergonomic aspect.
Keperluan pelajar (kantin, tandas, laluan pejalan kaki) disediakan mengikut aspek ergonomik
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Strongly Agree
Sangat Setuju | <input type="checkbox"/> Agree
Setuju | <input type="checkbox"/> Disagree
Tidak Setuju | <input type="checkbox"/> Strongly Disagree
Sangat Tidak Setuju |
|--|--|---|---|

8. Library provided with sufficient amount of learning material in an ergonomic condition.
Perpustakaan yang disediakan adalah dalam keadaan ergonomik dan dengan jumlah bahan pembelajaran yang mencukupi.

<input type="checkbox"/> Strongly Agree Sangat Setuju	<input type="checkbox"/> Agree Setuju	<input type="checkbox"/> Disagree Tidak Setuju	<input type="checkbox"/> Strongly Disagree Sangat Tidak Setuju
--	--	---	---

9. Adequate extracurricular facilities provided (sports room and equipment).
Kemudahan kokurikulum yang memadai telah disediakan (bilik sukan dan peralatan sukan).

<input type="checkbox"/> Strongly Agree Sangat Setuju	<input type="checkbox"/> Agree Setuju	<input type="checkbox"/> Disagree Tidak Setuju	<input type="checkbox"/> Strongly Disagree Sangat Tidak Setuju
--	--	---	---

10. The availability of other services such as computer room, playground, gardening activities.
Perkhidmatan lain seperti bilik komputer, taman permainan, aktiviti berkebun yang telah disediakan.

State if any:
Nyatakan jika ada: _____

11. What are the special services provided? (Ex: Braille, Hearing Aid, Pedagogical).
Apakah perkhidmatan khas yang disediakan? (Contoh: Braille, Alat Bantuan Pengaran, Pedagogi).

PART C: IMPORTANCE OF ERGONOMIK ASPECT OF FACILITIES
BAHAGIAN C: KEPENTINGAN ASPEK ERGONOMIK PADA KEMUDAHAN

12. What are the importance of considering the ergonomic aspects in the facilities provided?
Apakah kepentingan aspek ergonomik bagi kemudahan yang disediakan?

13. To what extent do the facilities provided help the student in their achievement?
Setakat mana kemudahan yang disediakan membantu kepada pelajar dalam pencapaian mereka.

14. What are the behavior and characteristic changes in the student with the ergonomic aspect facilities?

Apakah perubahan tingkah laku dan ciri-ciri pelajar yang boleh didapati dengan kemudahan aspek ergonomik ini?

15. How do the ergonomic aspect facilities help the teachers in carrying out their duty?

Bagaimana aspek ergonomik pada kemudahan membantu guru dalam menjalankan tugas mereka?

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