

# CAMPUS LANDSCAPE ENVIRONMENT FOR STUDENT WITH DISABILITIES: A CASE OF INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM), GOMBAK CAMPUS

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## ABSTRACT

*The awareness regarding students with disabilities (SwDs) in campus of higher educational institutions has been increasing. This study investigates the access audit on the proper planning and designing of campus landscape environment which is not only useful for able-bodied people/students but also for the disabled people/students. Preliminary studies have identified challenges in providing accessible built environment in higher educational institutions. The analyzed reviews comprising of design guidelines and suitable landscape designs have been applied to suit the needs of SwDs in the campus landscape environment. This study provides a platform to discover the needs of SwDs, especially in campus environment, based on the type of disabilities and it is important to understand the needs of SwDs before making any decisions. The method of data collection used in this study is the qualitative approach based on case studies, semi-structured interviews, focus group discussions and access audit simulations. The expected outcomes of this study will contribute to design guidelines for outdoor campus landscape, thus allowing the management of universities in Malaysia to upgrade outdoor campus facilities as a whole. The findings will also provide a platform for related organizations to identify the needs of SwDs in higher educational institutions for their support facilities and services in order to help them survive whilst there.*

**Keywords:** *people with disabilities, student with disabilities, higher education, campus landscape, accessibility*

## 1. INTRODUCTION

Governments are increasingly looking to universities to produce human resources that have the capacities, skills and knowledge in order to meet 21st century needs. They also call on universities to facilitate the shift to knowledge-based economy and high-technology through effective linkages between research and industry in order to ensure that their countries have a competitive edge in the global market. Preparing young people to enter the labor market has therefore become a critical responsibility for universities. It is stated in the Malaysian National Philosophy of Education 1988 that “education in Malaysia is an ongoing effort to further develop the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving a high level of personal wellbeing as well as being able to contribute to the betterment of the society and the nation at large” (World Data Education, 7th Edition, 2010/11). Thus, there is no discrimination against everyone in terms of access in any educational institutions.

## 2. AIM AND OBJECTIVE

The aim of the study is to provide recommendations and suggestions for campus planning focusing on the needs of SwDs in outdoor spaces in order to create a barrier free campus environment. It has been proved that proper

campus planning and design with sustainable concept and approach helps to create an accessible environment for SwDs.

The specific objectives of this study are:

- i) To study the current conditions of the campus landscape and its suitability for PwDs/SwDs
- ii) To promote a barrier-free campus concept
- iii) To provide opportunities for SwDs to further their studies in local universities by auditing the facilities within the campuses.

### 3. PEOPLE WITH DISABILITIES (PwDs) IN BUILT ENVIRONMENT

Generalizations about “disability” or “people with disabilities” can be misleading. It is stated in the World Health Organization (WHO), that disability is a term to describe ‘any restriction or lack (resulting from any impairment) of ability to perform an activity in the manner or within the range considered normal for a human being’ (WHO, 2011). Meanwhile, the Disability Discrimination Act 1955 (DDA 1955) defines a disable person as ‘physical or mental impairment which has a substantial and long-term adverse effect on a person’s ability to carry out normal day-to-day activities’. The definition covers physical and mental impairments which include physical impairments affecting the senses such as sight and hearing, heart disease, diabetes, epilepsy. Moreover, mental impairments cover learning disabilities and mental ill health. Basically, PwDs have diverse personal factors with differences in gender, age, socioeconomic status, sexuality, ethnicity, or cultural heritage. Each has his or her personal preferences and responses to disability.

Referring to statistics by the World Health Organization (WHO) (2010), Malaysia is estimated to have between 1.3 to 2.6 million of people with disability. Based on the population, there are 359,203 PwDs registered with the Jabatan Kebajikan Masyarakat (JKM) (Figure 1). This shows an increase in the number of PwDs every year which in turn makes a population of PwDs become larger. Therefore, it is crucial to include and involve the needs of the PwDs in any development planning. Besides that, the latest number of application for ‘Kad OKU’ in Malaysia with JKM from January 2012 until June 2012 is about 90,866 (<http://www.jkm.gov.my/>).

Thus, the needs of PwDs have received attention from all parties, especially stakeholders since their number keeps increasing year by year. Proper planning and guidelines can ensure the possibility for them to access the environment.

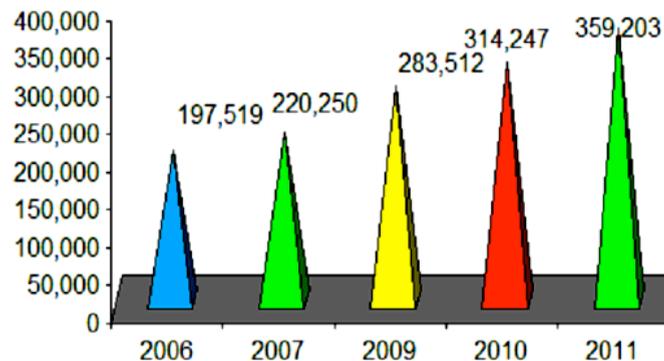


Figure 1: Number of registered people with disabilities in Malaysia 2006 – 2011 (Source: Jabatan Kebajikan Masyarakat, 2011)

### 4. EDUCATION AND STUDENT WITH DISABILITIES (SwDs)

The ministry has established three types of programs in the formal education system for these special needs students; for example, Special Education School, Special Education Integrated School, and Inclusive Program. Table below shows the increasing number of students which illustrates that they have strong intentions to study in order for them to become more knowledgeable.

Table 1: Number of classes, Enrolment in Special Education Integration Programme

	2009		2010		2011	
	Class	Enrollment	Class	Enrollment	Class	Enrollment
Preschool	137	521	136	536	141	573
Primary	3186	20083	3739	23104	3964	25181
Secondary	2016	13070	2374	15852	2607	18257

Unfortunately, chances for them to pursue their studies in higher education have become smaller due to the existing limitations (Figure 2). This is believed to have occurred due to a lack of enforcement by the higher education authorities who had neglected the needs of SwDs since the stage of planning (Hazreena, 2006). Thus, they have not received the same chance like other students since the institutions do not have the proper facilities for them to

further their studies. Frieden (2003) had also discussed the issue of access to education which means the preparation to further their studies earlier after secondary schooling. He further explains that SwDs lack self-determination and self-advocacy since, during the secondary level, they were not active participants in decision-making processes. Frieden (2003) also states that cost represents the major problem to the SwDs since time becomes another factor due to the extended period which sometimes makes it necessary for some SwDs in order to complete their studies.

BIL	KUMPULAN SOCIALLY DISADVANTAGED	BILANGAN PERMOHONAN	BILANGAN LAYAK	BILANGAN PENAWARAN
1	Program Pengajian Lulusan STPM/Setaraf (STPM/Matrikulasi/Asasi)			
	Orang Asli	66	44	43 (97.72%)
	OKU	656	415	282 (67.95%)
2	Program Pengajian Lulusan SPM/Setaraf			
	Orang Asli	164	138	28 (20.3%)
	OKU	189	147	49 (33.3%)

Figure 2: Diagram on the statistics numbers of SwDs offered by higher academic institutions to pursuing their studies for Academic Session 2010/2011 (Source: EDPD-MOE)

## 5. BARRIER FREE DESIGN OF CAMPUS LANDSCAPE FOR SwDs

People nowadays are struggling to create a barrier free of environment. The worldwide 'barrier-free' movement began in 1974, but it was not until 2001 that the term was adopted by the United Nations as part of its Treaty on the rights for people with disabilities. 'Barrier' means any factor that impedes, prevents or obstructs the full and effective participation, of persons with disabilities in society (www.oxforddictionary.com). This will include attitudinal, communicational, cultural, economic, environmental, institutional, political, religious, social and structural obstructions. In the international context, 'accessibility', 'usability' and 'universal design' are terms that are used to describe various relationships between people, activities, the environment, ideology and policy.

The concept of universal design (UD) has been used widely in variety of design field such as landscape design, architecture, engineering, and product design, since its conception and development by Mace in 1985 (Afacan, 2011). In general, universal design emphasizes the proactive integration of accessibility and usability to products and environments as fundamental constructs of design itself. While Iwarsson and Stahl, 2003 claimed that the term UD implies that the design of buildings, vehicles, or the environment, for example, takes into account that the needs of a diverse population rather than just an able-bodied one, and includes the interests of not just those with physical and/or intellectual impairments but also those of the elderly, children as well as adults, and people of diverse ethnic and national backgrounds (Figure 3).

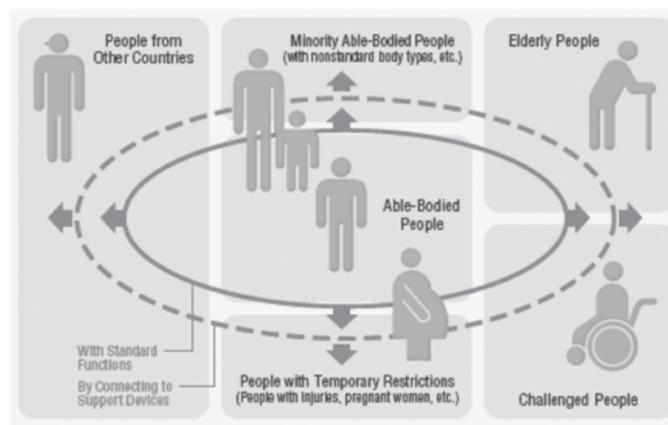


Figure 3: Concept of universal design is for all people (Source: <http://www.oki.com/en/csr/csract/customer/ud.html>)

According to Saito (2006), there are two concepts of accessible design and barrier-free design, which are often used as virtually synonymous terms. However, since these two concepts are usually focused on older people and people with physical disabilities, they are more parochial and considered inappropriate as similar concepts to universal design. UD's targeted users are not focused on specific people, but instead broadly on the inclusion of all types of people in the environment. The built-environment includes all external campus areas such as sidewalks, routes, parking lots, building and campus signage. During the implementation stage, it is very important to implement the principal of universal design in order to create an accessible campus environment especially for PWDs which at the end it can determine level of accessibility by universal design index. A universal design index

will be determined based on six aspects which are accessibility, connectivity, safety, usability, integrated design and operation and maintenance. According to Yam (2012), universal design can help people access the outdoor space as much as possible through increasing level of mobility which provide easiness in movement. Since universal design has been implied in built environment such as in building design, facilities and service accessible even for outdoor space it can help SwDs especially explore the spaces with their own.

## 6. METHODOLOGY

This study employed qualitative approaches. As an exploratory research, these data were collected based on primary and secondary data collections. This study also used literature review and case studies method of eliciting data which include; a) a fieldwork, b) a semi-structured interview, c) a focus group discussion and d) an observation. The purpose of literature review is to expose the issues, ideas and theories in line with the objectives and goal of the study. Thus, from the literature review, several aspects have been identified, including aspects of facilities provided, design and aesthetic, landscape, and security and lighting. After identifying those aspects, the researcher conducted case studies.

### a) Case Studies Approach

The case studies approach was selected in order to obtain an in-depth of study required to investigate the minimum requirement needed in order to cater to the needs of SwDs. This empirical study was based on the findings of observation conducted on two selected university campuses; Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM). These two university campuses have the criteria of being accessible campus environments. Apart from that, a fieldwork was also carried out at the International Islamic University Malaysia (IIUM) in order to obtain the basic needs of SwDs for an accessible campus environment for them.

### b) Interview and Focus Group Discussion

In total five respondents were selected for the interview. They were officers from the office of Students Affairs and Development Division (STADD), IIUM. They were selected based on their involvement and experience in handling SwDs in IIUM. The Interview is simply defined as a conversation with a purpose. The goal of conducting the semi-structured interview is to know the perceptions of administrative officers and professionals towards SwDs.

The goal of conducting the FGD is to know the basic needs of SwDs when they use the outdoor spaces. Besides that, it was also carried out in order to know the SwDs perceptions on existing campus environment. The discussion sessions were conducted with a group of SwDs at the IIUM Gombak campus. It included SwDs comprising wheelchair users, as well as those with physical disabilities, who are visually impaired, who are hearing impaired, and have learning disabilities. The interviewee data were collected from the Student Affairs and Development Division (STAD), IIUM. It included SwDs of wheel-chair user, physical disability, visual impaired, and hearing impaired. Thus, they were asked to share their experience using the facilities and services in campus area. The data were record in audio and video. FGD is 'a rapid assessment, semi-structured data gathering method in which a purposively selected set of participants gather to discuss issues and concerns based on a list of key themes drawn up by the researcher/facilitator'. Thus, it is important for the facilitator or researcher to guide the respondents (target group) to only discuss the theme.

### c) Observation and Access Audit Simulation

Based on several important criteria of campus landscape elements in relation to creating barrier-free campus environments identified in the literature review and supported by observations at UKM and UM, an access audit was thus carried out in order to identify the level of accessibility in the campus environment at IIUM Gombak campus. A fieldwork was conducted at the IIUM Gombak campus which focusing on two Mahallah areas (college areas). This was conducted to discover the level of accessibility for SwDs in campus area and identified spaces which need to be upgraded. Thus, an access audit for the campus college area was carried out. Since IIUM is a walkable campus, it is important to provide a good accessibility, connectivity and mobility for student orientations.

## 7. METHOD OF ANALYSIS

The interview data were analysed by using the Nvivo software and coded into several nodes to filter the best results. Some fieldwork named as 'access audit simulation' has been carried-out in order to identify the level of accessibility in IIUM Gombak campus as to support SwDs movement within campus area

which focusing at two Mahallah areas (college areas). Thus, the results will be used to identify the area that need to be upgraded in order to increase the level of accessibility in campus area especially for SwDs. Since IIUM is a walkable campus, it is important to provide a good accessibility, connectivity and mobility for student orientation.

## 8. ANALYSIS AND FINDINGS

### Perception of Management Officers

#### a) Awareness and Understanding of SwDs in Higher Education Institutions

The five officers interviewed include four STADD officers (IN1-IN4) and one lecturer (IN5). Each respondent was given a code accordingly. The respondents believed that awareness and understanding of the needs of SwDs is very important aspect that influences the campus landscape planning. Most of them responded that they are aware of SwDs.

*“... IIUM will try to accommodate the needs of student with disabilities by providing facilities for them...”*

(IN1)

Unfortunately, most respondents only viewed wheelchair users as SwDs compared to other disabilities. This shows that respondents lack understanding on the needs of SwDs in higher educations. So, this can affect the decision of SwDs enrolled at IIUM.

*“...priority will be more focused on wheelchair bound users because they really need special attention, especially in terms of providing ramps and routes that can be accessed by their wheelchairs...”*

(IN2)

*“The facilities are more focused on wheelchair user. Facilities provided included accommodations of room spaces and bathrooms and transportations, such as special vans...”*

(IN3)

Apart from that, respondents also agreed that they lack understanding on the need of SwDs especially in providing accessibilities and mobility. This results on SwDs orientation within campus area since the administrative officer cannot decide on the facilities that need to be upgraded in order to ease SwDs at campus area.

*“...we lack in term of understanding regarding their needs especially in movements and accessibility...”*

(IN3)

*“...I must admit that I lack understanding on the needs of SwDs...”*

(IN4)

#### b) Knowledge on the Basic Need of SwDs in Campus Landscape Environment

The interviewees were asked the questions regarding what the basic needs for SwDs in outdoor campus landscape are. In the content analysis, all the interviewees gave different views on the basic needs for SwDs when they were asked their understandings of a barrier-free concept, disabled friendly environment and universal design related to SwDs.

*“...universal design is a very good method because it is not only a design concept for SwDs but also include for everybody in built environment...”*

(IN5)

Furthermore, there was not much feedback regarding some basic knowledge on the needs of SwDs in campus areas except by those who are connected to the built environment field.

*“...they (administrative staff) do not really understand what universal design is all about...”*

(IN5)

*“...I do not really understand the concept of universal design but, as far as I am concerned it is meant to create an accessible place...”*

(IN4)

So, knowledge on the needs of SwDs is very important to ensure that officers do not have any negative attitudes towards SwDs. This is in line with preliminary studies which state that lack of understanding and knowledge about SwDs will lead to negatives attitudes among the administrative officers towards SwDs. These attitudes influence the success or failure of SwDs at the higher education level.

#### c) Ideas and Opinions in the Context of Campus Planning

In general, the situation can be improved based on the needs of SwDs.

*“...categories of SwDs need to be identified in order to create accommodation suitable for their needs and environment...”*  
(IN2)

Other than that, some of the interviewers expressed their dissatisfactions with some of facilities provided as for example, selections of softscape which can harm people.

*“...selection of plants also needs to be considered because there are plants that can harm SwDs...”*  
(IN5)

In addition, they also came out with some opinions regarding facilities which can help SwDs in their routines at the campus areas.

*“...facilities integrated with technologies are suitable for upgrading facilities for students with disabilities. For example, traffic lights for SwDs design only for them should be used...”*  
(IN1)

Thus, generally, SwDs really need facilities to ease their movements from one space to another.

#### **d) Barrier in Higher Educational Institutions**

College student are learning to take responsibilities on their own. Typically, students with and without disabilities need access to move from one space to another. Barriers exist for SwDs and administrative which include financial problems, services and among others. This may hinder the performances and participations of SwDs.

*“...we cannot provide everything (facilities) due to budget limitation...”*  
(IN5)

Lack of coordination can also become a barrier for SwDs. This is because they often overlook the facilities and services specific to an individual student's need. This will affect the movements of SwDs within the campus area which in return, affect the SwDs performances.

*“...once we receive student with disabilities, we will try to accommodate their needs by doing some renovations and improvements...”*  
(IN3)

*“The facilities and services only cover the central parts of the building areas which exclude the Mahallah area...”*  
(IN2)

In addition, lack of enforcement in implementing the act and regulation by related organizations can also contribute to creating barriers for SwDs in studying at the higher educational level.

#### **Perceptions of SwDs (FGD Results)**

##### **a) Satisfaction towards facilities provided in IIUM**

IIUM does not apply the universal design concept during the earlier planning; therefore, many facilities were been added later on. This means that many facilities do not meet the SwDs requirements.

##### **i) Physical Arrangement vs. Connectivity**

In campus planning, physical arrangement is really important since it can influence student behavior. According to Meacham (2012), physical space arrangement can influence human behavior. This is because the design of physical structures can affect an individual's mood and their perceptions of their surroundings.

While, the physical arrangement of elements can be broken down into different aspects of positioning and layout-putting elements in particular places to encourage or discourage people's interaction with them, putting them in people's way to prevent access to somewhere, or putting them on either side of people to channel or direct them in a particular way (<http://architectures.danlockton.co.uk>)

*“... IIUM has a diverse landform which is flat, slightly flat, undulating, and so on. Therefore, some places cannot be accessed especially by wheelchair users...”*  
(FGD 3, Multi-disabilities)

*“...the building arrangement is quite satisfactory since all locations are near to each other...”*  
(FGD 2, Physical disabilities (lower limb))

*“...we can identify other building directions/ orientations based on the location of the mosque. So, it is quite easy to find...”*  
(FGD 4, Wheelchair user)

*“...in terms of building arrangement for administrative buildings, the academic buildings, the mahallah building, it is very good in terms of planning...”*  
(FGD 5, Others)

Apart from that, connectivity between the buildings or spaces also very crucial to be emphasized in campus planning as it can help students' orientations within the campus areas.

*"...location of the building in IIUM is good. They are near to each other. But then, the facilities to support the connectivity are quite bad. In terms of accessibility to other buildings (kuliyyah), some of them are lots of barriers..."*

(FGD 1, Hearing impaired)

*"...arrangement of building is quite good but should be upgraded in terms of outdoor connectivity..."*

(FGD 3, multi-disabilities)

Thus, based on the respondents' point of view, this shows that connectivity in campus area still their main concerns.

## ii) Facilities to Support Connectivity

Facilities act as support element to increase the level of connectivity as well as mobility. This will ensure the level of access to the places. Most respondents claim that IIUM are lack facilities, especially for SwDs. Below are some responses gained from the discussions:

*"IIUM does not provide any facilities for blind people including the Braille trail for them to use..."*

(FGD 1, Hearing impaired)

*"...wheelchair bounded users cannot access the bus stop area as these are due to no curb ramps/step ramps to help them access the area..."*

(FGD 4, Wheelchair user)

Other than that, some respondents also state that the facilities provided do not follow the standard guidelines. These also affect the other students especially SwDs.

*"...most of the facilities provided do not following the standard guidelines..."*

(FGD 1, Hearing impaired)

*"...facilities in IIUM are quite good but some of them need improvements..."*

(FGD 5, Others )

*"...at stadium area, lots of drop basically more than 10mm which create barrier for me as a wheelchair bounded user to move around..."*

(FGD 4, Wheelchair user)

Overall, facilities are very essential to ensure connectivity of the place. It influences peoples' orientations at the places.

## b) Importance of Landscape Design in Campus Environment

Landscape design can ease students in terms of their movement and way finding among others. Landscape design elements include pathways, softscapes and hardscapes, lighting bollards and signages. These guide people to find places.

### i) Landscape design help way finding

Way finding is important since it is intended to provide people with information relating to their destination. Most of them agreed that, landscape design in IIUM has help them a lot in way findings. These views are also similar with those in preliminary studies that state how landscape acts as a means of communication to people directly and indirectly.

*"IIUM has a lot of elements which have become landmarks for people to refer to. For example, the main roundabout of IIUM. People easily recognized the area..."*

*"... IIUM uses one way direction which helps people a lot to access the area in IIUM..."*

(FGD 5, Others)

*"Yes, of course. Landscape design can become a landmark to help people to find the places..."*

(FGD 3, Multi-disabilities)

*"Landscape design really helps me and others to find places..."*

(FGD 4, Wheelchair user)

Apart from that, some landscape designs have also become issues for SwDs, especially to those who are visually impaired.

*"... selection of trees at IIUM also are not really suitable since they can give hazard to them due to the characters of the trees..."*

(FGD 5, Others)

## ii) Landscape design influence student learning

Preliminary studies show that landscape design help student learning process directly and indirectly. The respondent agreed that landscape design sometimes helps them during the learning process.

*“...there is no doubt that landscapes help me during the learning process...”*

(FGD 5, Others)

## iii) Landscape design vs safety

Safety becomes very crucial when designing the environment since it involves human beings.

*“... lack of lighting will lead to other thing which can harm people...”*

*“Safety has also become a concern since most facilities provided for SwDs was still lacking. So we need to share the roads with other vehicles to go to other places...”*

(FGD 1, Hearing impaired)

Thus, in general, landscape design can help in creating a comfortable living campus. This result was in line with preliminary studies that landscape can enhance student living environment in the campus areas.

## c) Experience/barrier faced while using facilities

Barrier sometimes can hinder people from enjoying the facilities provided. A good mobility will produce continuity of movement since it makes the link with other pedestrian systems as well as ease people movements. Unfortunately, most respondent claim that they have experienced many obstacles while using the facilities provided in IIUM.

*“Apart from that, we might also add some railings along the walkways to assist as well as direct people to places...”*

(FGD 1, Hearing impaired)

*“...other people have misused the facilities meant to be used by SwDs. For example, PwDs parking areas, they park their motorcycles at ramps which block the route...”*

(FGD 5, Others )

In terms of distance, the respondent claim that they need to use a long distance routes in order to reach at places.

*“...compared to other studenst, SwDs need to use alternative routes for them to reach the places...”*

(FGD 3, Multi-disabilities)

*“...I felt from my wheelchair as consequence avoiding a motorcycle (park) at the ramp area...”*

(FGD 4, Wheel-chair user)

Besides that, some respondents also claim that they sometimes have difficulty communicating with others. This is related to peoples' awareness of SwDs. It was state in earlier chapter that people are lack understanding of the needs of SwDs which in turn affect the SwDs.

*“Miscommunication among staff (administration) leads to misunderstanding...”*

(FGD 4, Wheel-chair user)

## Access Audit Simulation

This section presents the general approaches in analyzing data obtained from the fieldwork studies and deriving and synthesizing results and findings of access audit simulation which were conducted at the case study areas; Mahallat Uthman Ibn Affan and Mahallat Nusaibah. The analysis of a component comprises of three aspects which is landscape design elements, existing conditions, and proposals for improvements. Each component was observed, measured and recorded as per checklist. All observations, measurements and other forms of assessments were made in reference to the Malaysian Standard (MS 1331:2003, MS 1184:2002). The access audit simulation is systematically approached through the use of a prepared layout plan to identify the routes that can be used for the simulation process. Each point has been analyzed and measured to identify the level of accessibility of the marked area. After the compilation and checklist were made with the available sources of secondary information, the level of accessibility was determined for each area. Based on the overall aspects measured, conclusions were made on each of the study area pertaining to its overall accessibility level.

Results correspond, that lack of the facilities provided in campus area lead to difficulty in terms of mobility, accessibility and also connectivity for SwDs. This create barrier for them to move around in campus area. Some of current situation which need to be improved and upgrade in order to increase level of accessibility:



Figure 4. Condition of pedestrian walkways which very steep, do not suitable for wheelchair user (left), upgrade slope of ramp according to MS 1331:2003

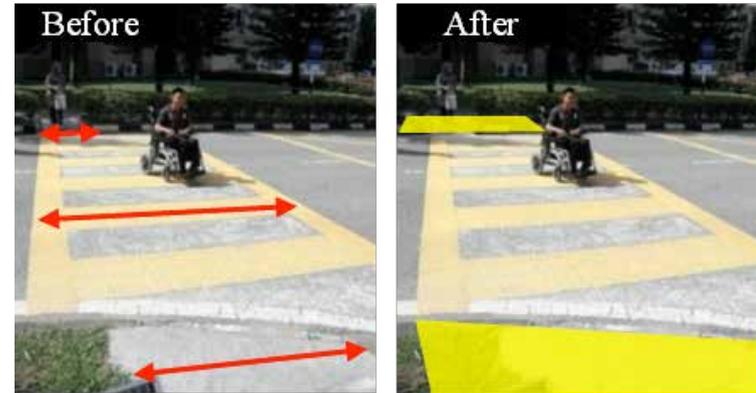


Figure 6. The bus stop is not accessible due to lot of change of level (left), while proposed ramp and step ramp to be installed can increase level of accessibility.



Figure 5. The presence of step will break the level of accessibility esp. for wheelchair bounded (left), while proposed to install ramp, warning tactile and railing in order to break the barrier.

## 9. DISCUSSION

The findings on this research are arranged in such a way to provide the answers to the research objectives above. They are divided into several keys parts, such as current situations/conditions of campus landscape and its suitability for SwDs, criteria of creating a barrier-free environment in campus planning, and basic facilities within the campus landscape environment for SwDs. The major findings are presented in the following sections.

### a) Research Objective 1: Current Situations/Conditions of the Campus Landscape and Its Suitability for Pwds/Swds

SwDs also have the right to get access in all educational level as through educational, they can only improve themselves. Thus, SwDs must have a proper environment for them to move around since be in

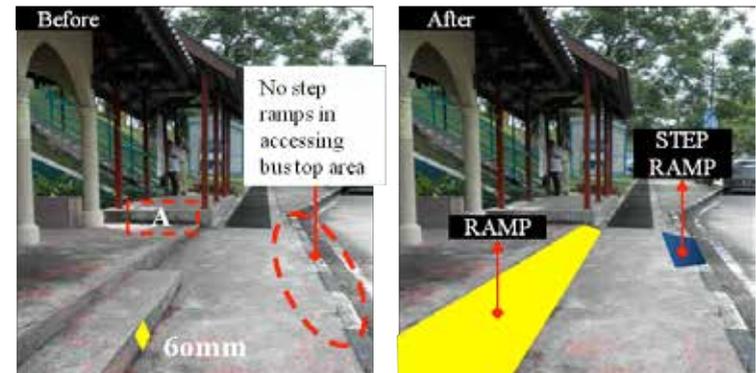


Figure 7. Pedestrian crossing do not follow the standard guideline (left), proposed install step ramp on both side to ease the movement and lines of raised pavement markers to increase the safety.

the higher educational level, they are requiring being independents. Based on the analysis of the first objectives, the findings show that the currents situations of campus landscape do not really suit with the needs of SwDs to move around within the campus area. In terms of physical facilities that supports the SwDs mobility, the current situations show that, people were intend to provide the facilities for SwDs, however, they do not follow the guidelines and recommendation provided by

authorities which at the end effect SwDs movement. Below are some of examples taken from several universities:



Figure 8: Parking area for PwDs/SwDs in UKMs' mosque area is not appropriate for them to use it



Figure 9: Ramp at library area in UKM does not follow the guideline provided by authorities



Figure 10: Placement of potted plant in pedestrian walkways become obstruction for people



Figure 11: Uncovered drainage will lead to problem to student (left), while proposed covered drainage with some railing to ease SwDs movement (right).



Figure 12: People just simply their motorcycle near to the ramp which lead difficulty especially to wheelchair bounded (left), proposed signage to warning people (right)

Thus, it show that, people do not really understand the concept of universal design which can help them provide a good facilities that can support SwDs to move especially within the campus area. These were in line with the previous chapter states that people do not really understand the concept of Universal Design and it implementations in providing the facilities. Thus, it may hinder SwDs/PwDs from enjoying the facilities provided in campus areas.

**b) Research Objective 2: Criteria of Creating Barrier Free Environment on Campus Landscape Environment**

In the context of creating barrier free environment, there are several important factors that can be highlighted throughout this study. They are accessibility, usability and safety. In terms of accessibility that increases the mobility of SwDs, it has been found that most of campuses are lacking in providing the facilities that can support SwDs in their daily life within the campus area. Based on the findings, there are actually have some facilities that cater the need of SwDs, however, it do not follow the guideline and recommendation from authorities. These, at the end, create a barrier for SwDs to use it since the facilities do not suit with their needs. As for example, wheelchair user need at least 1200mm clear of pedestrian walkways to allow them to maneuver their wheelchair. This has states in the Malaysian Standard (MS) 1331:2003, that the clear width of pedestrian walkways should at least 1200mm clear.

Besides that, as for the factors of usability, based on the findings in earlier chapter, it can be concluded that, lack of usability may hinder SwDs from use the facilities provided by university. This has gives effect to the SwDs to access from one space to another. Figure 7.4 show facility (ramp) provided for wheelchair user to access the space. However, the condition of the ramp was hindering them to use it due to the broken surface of ramp which can gives hazards for them. On top of that, the factors of safety become very crucial when designing the environment since it was involved human beings. This is also in line with the previous chapter that, most of SwDs especially has stress on the safety factors. They states that, safety are become their priority when navigating the space.

**c) Research Objective 3: Basic Facilities within the Campus Landscape Environment for Swds**

It is important for university to provide facilities to cater the basic needs of their students. Research have identified that the overall

basic facilities for SwDs in IIUM Gombak campus landscape area does not fulfill the need of SwDs. Hence, lot of improvement need to be done in order to create a barrier free campus environment for them. This also can become one of advantages for the university to promote the campus. There are a major different between two case studies in IIUM Gombak campus which is the topography of the site. Since Mahallat Uthman Ibn Affan located at flat area while Mahallat Nusaibah were located at hill area, therefore, lot of improvement need to be done for Mahallat Nusaibah to accommodate SwDs especially wheel chair user. Apart from that, research also has identified several routes to be used by SwDs from case studies area to the core building. This will increase the level of accessibility in overall campus area. Thus, several mobility element has been identified in improve the connectivity between places surround the campus area. So, facilities only installed in identified route.

There is a relationship between people and the environment which they live in. People have the ability to shape and change their environment while at the same time they are shaped and changed themselves. These means that people are actually influence by environment since it can affect people mood and orientation. Below are some examples of basic physical facilities that can increase the level of accessibility within the campus environment: Therefore, the universities must provide at least, basic facilities which follow the guideline provided by authorities to ensure the level of accessibility within the outdoor campus environment.

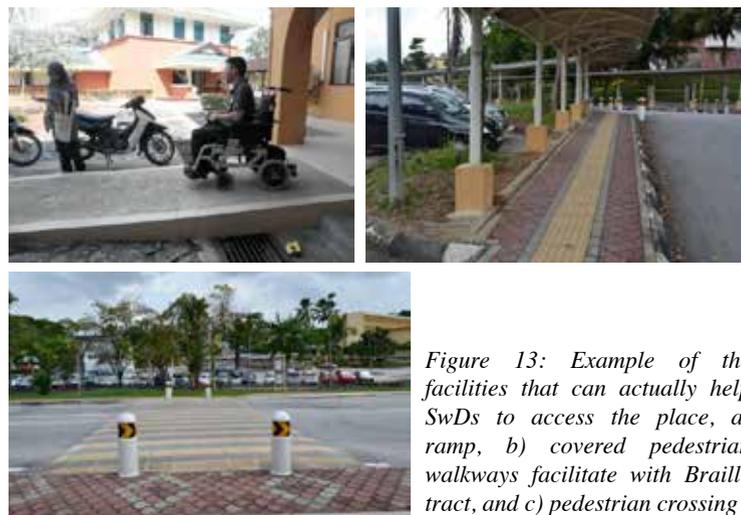


Figure 13: Example of the facilities that can actually help SwDs to access the place, a) ramp, b) covered pedestrian walkways facilitate with Braille tract, and c) pedestrian crossing

## 10. CONCLUSION

The study provides a platform to explore the need of SwDs especially in campus environment based on the type of disabilities such as physical impaired, visual impaired, hearing impairment, wheelchair user and learning disability. It is important to understand the need of SwDs before making any decision. Good campus physical environments can be understood better and improved by greater sensitivity to their nonverbal communications, by increasing designs and spaces that give a sense of comfort and security for SwDs. Therefore, findings provide a platform for related organization to identify the needs of student with disabilities in educational institution for their support facilities and services in order to help them survive in higher education level. In addition, student with disabilities will have the same opportunity with others to enter higher educational level.

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