

Accessibility to Facilities for Persons with Disabilities at Public Institutes of Higher Learning

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Abstract: *Issues related to Persons with Disabilities (PWD) rights are increasingly being considered in Malaysia. This includes their rights in education, employment, healthcare as well as access to the facilities and services provided. Accessibility in education especially at universities are among the major issues faced by PWD. Therefore, this study was conducted to identify the accessibility of facilities for persons with disabilities in public institutes of higher education. This study focuses on structured observations of PWD facilities at four faculties and four resource centres in Universiti Kebangsaan Malaysia. Five basic facilities for PWD such as parking space, stairs, lifts, toilets and pathways/ramps were thoroughly observed. A detailed comparison was carried out to identify the accessibility of those facilities and the extent of compliance to specifications outlined in universal design criteria. The study findings show that although PWD facilities were available, those facilities were still inadequate and did not follow the specifications set. Facility providers namely the university should devise a specific action plan and establish an inclusive policy for PWD to ensure their rights and needs are entirely fulfilled.*

Index Terms: Accessibility, Facilities, Persons With Disabilities, Universal Design

I. INTRODUCTION

The Minister of Education's 2019 Mandate titled 'Education for All, Responsibility for All', stated that education is the true path to achieving Vision 2020. In efforts to create a democratic, morally upright and ethical society, as well as being capable in various aspects, no one should be neglected. This means that all individuals have the right to receive quality education regardless of their background, social status or physical ability. This is supported by Bodaghi and Zainab [1] who claim that access to all facilities,

resources and services is the right of every individual in society despite differences in abilities and limitations. Statistics released by the Department of Statistics Malaysia on November 28, 2018 show that there were 453 258 PWD registered with the Department of Social Welfare in 2017.

The increasing number of PWD directly affects the increasing number of disabled students in institutions of higher education. This shows that PWD are just as capable in education as other individuals. However for disabled students, obstacles begin to arise due to external factors such as their surroundings that are not disabled friendly. To produce successful disabled graduates, two key barriers need to be overcome. Firstly, specialized services must be provided to maximise the ability of students to fully participate in their chosen course of study. Secondly, in terms of facilities on campus. The campus must have a disabled friendly design in addition to basic facilities that can be easily accessed by PWD [2].

The Persons with Disability Act 2008 (Act 685) also provides for facilities for the disabled in Article 26:

"Persons with disabilities shall have the right to access to and use of, public facilities, amenities, services and buildings open or provided to the public on equal basis with persons without disabilities, but subject to the existence or emergence of such situations that may endanger the safety of persons with disabilities."

However, a study by Hazlin and Safura [3] at an institute of higher learning in Klang Valley found that disabled facilities were still not fully provided by management. Basic facilities that were provided such as pathways/ramps, rails, lifts and stairs were not comprehensive and caused barriers to the movements of the disabled. Meanwhile, basic facilities at Universiti Kebangsaan Malaysia were also at a minimum particularly at student focal areas such as student association buildings, lecture halls, residential colleges and sports complexes [4]. As such, this study is carried out to identify the facilities provided at Universiti Kebangsaan Malaysia (UKM), Bangi Campus according to areas that are the main focus of students. In addition, this study also identified whether the facilities provided complied with Universal Design Guidelines issued by the government.

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II. LITERATURE STUDY

A. Acts and laws

In year 1994, Standard Rules of Equal Opportunity for Persons with Disability was introduced based on advocacy from United Nations Human Rights Council (UNHRC). Consequently, in 2006, a convention regarding PWD rights, namely UNCRPD (United Nations Convention on the Rights of People with Disabilities) was organized to empower the rights of the disabled to ensure social and development equality in all aspects of life. One of the essence of this convention is that all participating countries must identify and eliminate accessibility obstructions and constraints to buildings and physical surroundings.

Among the major challenges often faced by PWD in Malaysia are related to issues of transportation and physical environments [5]. Like other developing countries, Malaysia has also taken proactive steps by providing disabled facilities to address these constraints. Apart from PWD Act 2008 (Act 685), the government under the Ministry of Women, Family and Community Development drafted a PWD Action Plan 2016-2022 blueprint. There are 10 strategic cores emphasized in the action plan. For the purpose of this study, Strategic Core 1 that is to increase PWD accessibility is seen as the most significant. One of the main objectives of the strategic core is to increase the provision of access to physical surroundings in both urban and rural settings based on universal design concepts. Various ministries and government agencies are involved in the planning of short-term plans (2016-2018) and long-term plans (2016-2022).

Taking a look at governmental departments, access to disabled facilities have improved but is not fully implemented. The Ministry of Housing and Local Government has also issued guidelines for universal design (2015) which outlines the need to plan more facilities and urban settings that feature universal design. These facilities must be accessible to all individuals including PWD without any physical obstructions. For Malaysia and other developing countries, the awareness and inclusion of universal design is still at its infancy. Although there are commendable acts, laws and action plans on this issue, the enforcement authorities involved do not strictly enforce the need to provide disabled access in each surrounding [6].

B. PWD facilities in Malaysia

The concept of universal design was introduced by a disabled architect named Ronald Mace in year 1985. He defined universal design as the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, without the need for adaptation or specialized design regardless of their age, ability, or status in life [7]. Apart from being used in the field of architecture, this concept is also accepted in the field of engineering as well product and landscape design. Another issue that needs to be addressed other than the design of the amenities is in terms of accessibility. Accessibility is defined as design quality of environments that can be accessed by people with disabilities and senior citizens. It is closely

related to the barrier-free design concept that eliminates all structural obstacles that exist in a particular building [8][9].

The study carried out by Syazwani and Mariam [10] identified basic amenities that are a key necessity to the disabled. For the visually impaired, they need tactile blocks, warning signs for indoor facilities and building signage that can provide them with information of their location. On the other hand, for the physically disabled, a pathway or ramp is crucially needed as they face difficulties navigating areas with steep gradients. Apart from that, they also face obstacles at ablution areas as well as toilets that are not disabled friendly in terms of utensils, size and layout.

C. PWD facilities at institutes of higher learning

Internationally, efforts to assist PWD in accessibility issues are actively carried out. Universities in the United Kingdom for example are required to respect and ensure that PWD rights are complied with under the Equality Act 2010 and United Nations Convention. For example, at Oxford University they take great care in assisting with the travelling and movements of the disabled on campus. It can be observed from the university's website that access guides are provided in each department which makes it easier for PWD to plan their movements prior to arriving at their destination. This also facilitates PWD in assessing the extent of disabled facilities provided at the university before applying for admission there.

Public institutes of higher learning in Malaysia are also increasingly concerned about PWD accessibility issues. For example, Universiti Malaya (UM) and Universiti Islam Antarabangsa Malaysia (UIAM). Both universities have established PWD inclusive policies aimed at fulfilling and protecting the rights of disabled staff and students whilst on campus. In correspondence to the increase of PWD at both universities, disabled facilities are also being added at most institutions of higher learning. However, easily accessible facilities are still lacking at the main buildings on campus. Most of the buildings have disabled facilities, but these facilities do not comply with the specifications set for disabled facilities. As a result, these conditions make it difficult for PWD to access these facilities.

There are five major barriers that are often faced by disabled students at institutes of higher learning namely access to higher education, access to information, physical surroundings, assumptions of 'normality' and level of disability awareness [11]. In this study, the researcher only focused on facilities as it is deemed to significantly impact disabled students at universities. This is because quality facilities will facilitate the movements of the students thus enabling them to live life as the other students. A study by Tinklin and Hall [11] also found that some disabled students were unable to further their studies in their chosen course despite being eligible due to the unavailability of facilities for the physically disabled at the faculty.

This matter is extremely disappointing as the PWD right to receive equal education as other students is neglected. In order to enable PWD to receive quality education, comprehensive facilities catered to their needs should be provided. In Malaysia, studies regarding disabled facilities are increasingly being conducted. However, there are still gaps that need to be filled particularly on the provision of basic facilities. For example, a study conducted on visually impaired students at University Malaya found that pedestrian areas, toilets, recreational areas, transportation, libraries, residential halls and lecture halls were areas that were in dire need of specialized disabled facilities. Furthermore, among the facilities that should be given more attention are the pedestrian areas and the toilets. Findings from the study suggests that these facilities should be added to areas that become the focal area for the disabled [12]. Even though facilities for the disabled were provided, there still exists many shortcomings including facilities that were inaccessible, inadequate and of poor quality [13]. This includes issues of facilities that could not be accessed due to being too far as well as facilities that that did not comply with the specifications set for PWD facilities. Therefore, this study was conducted to identify accessibility of PWD facilities at Universiti Kebangsaan Malaysia as one of the nation's public institute of higher learning.

III. METHODOLOGY

This study uses a qualitative approach that is by case studies. Case studies were conducted to collect data, obtain meaning and gain insight from a case [14]. In this study, the researchers used case studies to observe and identify the types of facilities provided for physically disabled and visually impaired individuals at four faculties and four student resource centres in UKM. All four faculties were chosen based on the higher number of disabled students there compared to other faculties.

| FACULTY/ CENTRE | NUMBER OF PWD STUDENTS |
|--|------------------------|
| Faculty of Education (FPend) | 11 |
| Faculty of Social Sciences and Humanities (FSSK) | 10 |
| Faculty of Science and Technology (FST) | 7 |
| Faculty of Economics and Management (FEP) | 6 |

The four resource centres selected are Tun Seri Lanang Library (PTSL), Pusanika, Wisma UNIKEB and Academic Management Centre (BPA). Based on observations made, these four places are the most frequented by students in UKM. The researchers then compared all the facilities provided at all the selected places against the Universal Design Guidelines issued by the Department of Local

Government, Ministry of Urban Wellbeing, Housing and Local Government 2015.

Five basic facilities needed by PWD were selected for detailed observation in this study namely parking space, stairs, lifts, toilets and pathways /ramps. Previous studies that were conducted on disabled facilities at several hospitals also listed these five facilities as key facilities needed by PWD in daily life [15]. This study also focused on facilities that were used the most by the physically disabled and visually impaired as the number of PWD from both categories are the highest at UKM.

The results from this study will compare the facility characteristics at several building in UKM with the characteristics that are specified in the universal design criteria. From the results of the study, the parties involved will be able to identify the extent of improvements needed to facilitate the disabled using the facilities.

IV. STUDY RESULTS

A. PARKING SPACE

| Universal design indoor criteria | Perpustakaan Tun Seri Lanang (PTSL) | PUSANIKA | UNIKEB | ACADEMIC MANAGEMENT SECTION (BPA) | FACULTY OF SOCIAL SCIENCES AND HUMANITIES | FACULTY OF EDUCATION | FACULTY OF ECONOMICS AND MANAGEMENT | FACULTY OF SCIENCE AND TECHNOLOGY |
|---|-------------------------------------|-----------------------|------------------------|-----------------------------------|---|-------------------------|-------------------------------------|-----------------------------------|
| Number of disabled parking space | Only one | Only two | Only one | Not provided | Only three | Only one | Only one | Only one |
| Wheelchair user parking symbol on parking space surface | X | √ | X | | √ | X | √ | √ |
| Car park space for entry and exit 5400mm × 3600m (L×W) | 5030mm x 2050mm (L×W) | 6220mm x 2440mm (L×W) | 3900mm x 2260mm (Lx W) | | Parking A and B : 6500mm x 2170mm (L x W) Parking C : 5000mm x 2400mm (L x W) | 2700mm x 4800mm (L x W) | 5670mm x 2540mm (L x W) | 4750mm x 2930mm (L x W) |
| Transfer area minimum of 1200m | X | X | X | | X | X | X | X |

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|--|-----------------------|---|----------------------|--|-----------------------|----------------------------------|---|---|
| Signage height from floor surface: 1500mm | Signage height 1900mm | | Signage height 900mm | | Signage height 1600mm | Signage height 1600mm | | X |
| Separate lift to access the building | √ | | | | X | X | | |
| Minimum height of entrance to parking area: 2400mm | Height 2400mm | | √ | | | | | |
| Disabled parking is provided near the main entrance and is not more than 50m away. | | √ | √ | | √ | More than 50m from main entrance | √ | √ |

Table 1: Disabled parking facilities at UKM

Table 1 shows disabled parking space facilities are provided at all places except for Academic Management Centre (BPA). However, the number of parking spaces provided do not follow the ratio of 1:2 specified for every 100 parking space. There are also parking spaces that were not marked with a disabled parking symbol and are only based on signage provided. In addition, all parking spaces provided did not have a transfer area which makes it extremely difficult for disabled drivers to enter and exit their vehicle. All parking spaces at the buildings involved also do not comply with entry and exit parking space specifications that is 5400mm long and 3600mm wide. Separate lift to access the building is only provided at Tun Seri Lanang Library (PTSL).

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B. STAIRS

| Universal design indoor criteria | Perpustakaan Tun Seri Lanang (PTSL) | PUSANIKA | UNIKEB | ACADEMIC MANAGEMENT SECTION (BPA) | FACULTY OF SOCIAL SCIENCES AND HUMANITIES | FACULTY OF EDUCATION | FACULTY OF ECONOMICS AND MANAGEMENT | FACULTY OF SCIENCE AND TECHNOLOGY |
|---|-------------------------------------|------------------------------|--------------------------------|-----------------------------------|---|--|-------------------------------------|-----------------------------------|
| Step height of not more than 180mm and length of not less than 260mm | Height 140mm Length 280mm | Height 140mm Length 270mm | Height 152.4mm Length 254mm | Height 160mm Length 280mm | Height 120mm Length 190mm | Height 150/140(mm) Length 250/280(mm) | Height 150mm Length 310mm | Height 150mm Length 260mm |
| Landing area that is free from barriers, width is not less than 1500mm | Landing area width 2940mm | Very spacious | Landing area width 3400mm | Landing area width 2880mm | Landing area width 1200mm | Landing area width 1460mm/1800mm | Landing area width 1750mm | Landing area width 2000mm |
| The 300mm wide warning type tactile is mounted at a distance of 300mm between the tactile and the end of the first step | X | X | X | X | X | X | X | X |

Table 3: Stairs facilities at UKM

All indoor stairs that were studied have a height of no more than 180mm. The width of the landing area also does not exceed 1500mm and there is adequate space to accommodate the movements of PWD. However, all of the buildings did not install warning tactile for the visually impaired.

C. LIFTS

| Universal design indoor criteria | Perpustakaan Tun Seri Lanang (PTSL) | PUSANIKA | UNIKEB | ACADEMIC MANAGEMENT SECTION (BPA) | FACULTY OF SOCIAL SCIENCES AND HUMANITIES | FACULTY OF EDUCATION | FACULTY OF ECONOMICS AND MANAGEMENT | FACULTY OF SCIENCE AND TECHNOLOGY |
|--|---|----------|-------------------------|-----------------------------------|---|----------------------|-------------------------------------|-----------------------------------|
| Interior size of lift : not less than (1100mm x 1400mm) | PWD lift interior size | NO LIFT | L :1050mm x W:1200mm | L: 1250mm x W:1600 | L :1600mm x W:1700mm | NO LIFT | PWD lift interior size | PWD lift interior size |
| Mirror is installed opposite the lift door | L: 1630mm x W:1730mm, mirror is installed | | X | X | X | | X | X |
| Interior size of lift trolley and stretcher is not less than (1200mm x 2300mm) | L:1640mm x W:1890mm | | L: 1050mm x W:1200mm | L:1250mm x W:1600mm | X | | X | L:1400mm x W:1960mm |
| Door width is not less than 900mm. | Door width 1100mm | | Door width 900mm | Door width 1100mm | Door width 1100mm | | Door width 1120mm | Door width 1060mm |

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|---|---|--|---|------------|---|--|---|---|
| Minimum of 1 handrail is provided inside the lift : i. Measures between 40 mm – 50mm ii. Handrail height of (800mm–900 mm) from the floor | X | | X | √ √ | X | | X | X |
| Braille lettering is provided on the lift control buttons and is easily identifiable. | X | | X | √ | X | | X | X |
| Clear and easily identifiable emergency intercom button. | √ | | √ | √ | √ | | √ | |
| Sound system alert for each level. | X | | X | √ | X | | X | X |

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|---|--|--|---|--|---|--|-----------------------------------|-----------------------------------|
| Lift control buttons panel are installed between 900mm – 1200mm from floor surface inside and outside the lift. | Outside lift: 920mm Inside lift: 1100mm | | Outside lift: 1000mm Inside lift : 1100 mm | Outside lift : 1100mm Inside lift: 840 mm | Outside lift: 900mm Inside lif: 1000mm | | Lift control buttons panel 1120mm | Lift control buttons panel 1150mm |
|---|--|--|---|--|---|--|-----------------------------------|-----------------------------------|

Table 4: Lift facilities at UKM

Of the eight buildings studied, PUSANIKA and the Faculty of Education building did not have lift facilities. In terms of interior size, all the lifts followed the minimum size specified. All the lifts had an emergency intercom button that was clearly and easily identifiable. The control buttons panel were fitted at a height of 900mm – 1200 mm from the floor surface inside and outside the lift. The width of the lift door also exceeded 900mm. However, for the visually impaired, only the lift at the Academic Management Centre (BPA) had braille lettering on the lift control button, sound system alerts for every level and handrails inside the lift.

D. TOILETS

| | | | | | | | | |
|---|--|-----------------|---------------|--|--|-----------------------------|--|--|
| Universal design indoor criteria | Perpustakaan Tun Seri Lanang (PTSL) | PUSANIKA | UNIKEB | ACADEMIC MANAGEMENT SECTION (BPA) | FACULTY OF SOCIAL SCIENCES AND HUMANITIES | FACULTY OF EDUCATION | FACULTY OF ECONOMICS AND MANAGEMENT | FACULTY OF SCIENCE AND TECHNOLOGY |
|---|--|-----------------|---------------|--|--|-----------------------------|--|--|

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|--|---|--------------------|--------------------|---|---|--|--|--|
| Provide PWD needs such as: i. At least one toilet cubicle that can be accessed by a wheelchair ii. The toilet that can be accessed by a wheelchair must have a sink. | One disabled toilet on level 4 √ | NO DISABLED TOILET | NO DISABLED TOILET | One disabled toilet on level 1 √ | Three disabled toilets on level 3 and 4 Only one toilet has a sink | Five disabled toilets are provided on level 1 and 2 All toilets have a sink | Two disabled toilets at every end of the building √ | Two disabled toilets |
| Symbols are easily identifiable and is displayed for the use of the visually impaired and mentally impaired. | Disabled symbol only displayed on the toilet door | | | Disabled symbol only displayed on the toilet door | Disabled symbol only displayed on the toilet door | Disabled symbol displayed on the front of the toilet door | Disabled symbol displayed on the front of the toilet door | Disabled symbol displayed on the front of the toilet door. |
| Minimum entrance of 900 mm x 900mm. | L: 810mm W: 810mm | | | L : 900mm W : 950mm | L: 920/1000mm W: 900/950mm | L: 920mm W: 900mm | L: 1580mm W:1580mm | 1000mm |

| | | | | | | | | |
|--|------------------------|--|--|-------------------------------|--|-------------------------------|------------------------|-------------------------------|
| Has a minimum space of 1700mm x 2200mm (L x W) | L: 1860mm W: 1660mm | | | L: 1700mm W: 1400mm | L:1900/19500 mm W: 1800/1900mm | L:2500mm W: 1800mm | L: 1700mm W: 2190mm | L: 1800mm W: 1830mm |
| The toilet is not slippery | √ | | | √ | √ | √ | X | √ |
| Toilet door opens outwards, has a minimum opening of 800 mm. It is recommended to use a sliding door | Uses a sliding door | | | Door opens by pushing inwards | First design: A normal door that opens from the inside. Door opening is 850mm Second design: Uses a sliding door. Door opening of 900mm | Door opens by pushing inwards | Uses a sliding door | Door opens by pushing inwards |

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|--|---|--|--|--|---|---|------------------------|---|
| Utensils inside the toilet are fitted at a low position as follows: i. Soap dish, hanger ii. Towels and hand dryer: 800mm – 1100mm from floor level. iii. Mirror is placed no less than 900mm from floor level. | X 930mm from floor level | | | | X 900mm from floor level | X 900mm from floor level | X X | √ 900mm from floor level |
|--|---|--|--|--|---|---|------------------------|---|

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|--|--|--|--|--|---|-------------------------------------|--|--|
| Grab rails on both sides (either drop-down or permanently fixed to the wall) is provided at a distance of 300 mm to 350 mm from toilet bowl. | Only one grab rail is provided next to the toilet bowl | | | There are no grab rails provided next to the toilet bowl | Both toilets have one grab rail next to the toilet bowl | All toilets have only one grab rail | Only one grab rail is provided next to the toilet bowl | Only one grab rail is provided next to the toilet bowl |
|--|--|--|--|--|---|-------------------------------------|--|--|

Table 5: Disabled toilet facilities at UKM

Disabled toilet facilities were only available at five buildings studied and were not available at two buildings, PUSANIKA and Wisma UNIKEB. The disabled symbol was only displayed at the front of the toilet door only. Entrance to all toilets exceeded the minimum of 900 mm x 900mm. The recommended type of door for disabled toilets are sliding doors, but these doors were only used at PTSL and the Faculty of Economics and Management. All the disabled toilets did not have utensils such as soap dish, towels and hangers. Mirrors were also affixed at 900mm from the floor level except for the disabled toilet at the Faculty of Economics and Management that did not have a mirror. As for grab rails, only one grab rail was provided in every toilet.

E. PATHWAYS OR RAMPS

| Universal design indoor criteria | Perpustakaan Tun Seri Lanang (PTSL) | PUSANIKA | UNIKEB | ACADEMIC MANAGEMENT SECTION (BPA) | FACULTY OF SOCIAL SCIENCES AND HUMANITIES | FACULTY OF EDUCATION | FACULTY OF ECONOMICS AND MANAGEMENT | FACULTY OF SCIENCE AND TECHNOLOGY |
|----------------------------------|-------------------------------------|----------|--------|-----------------------------------|---|----------------------|-------------------------------------|-----------------------------------|
|----------------------------------|-------------------------------------|----------|--------|-----------------------------------|---|----------------------|-------------------------------------|-----------------------------------|

| | | | | | | | | |
|---|---|----------------|--|---------|-----------------------------------|---------------|-----------------------------------|---------------|
| Provided for any changes in surface height. Stairs are provided adjacent to the ramp if the level difference exceeds 300mm. | √ | √ | √ | NO RAMP | √ | √ | √ | √ |
| Ramp width is not less than 1200mm. | Width: 1260mm but is obstructed by a pole | Width : 1250mm | Width : 1350mm | | Ramp A :1400mm Ramp B : 1000mm | Width: 1300mm | Width: 1525mm Handrails 1000mm | Width: 1510mm |
| Handrails are provided on both sides of ramps that are longer than 800mm. | √ | X | Handrail is provided only on the left side | | X | √ | Only on one side | √ |
| Stable ramp surface and is not slippery in both dry and wet conditions. | X | √ | √ | | √ | √ | √ | √ |

Pathways or ramps are available at all the buildings except at the Academic Management Centre (BPA). The width of the ramps were not less than 1200mm. Handrails were not provided at PUSANIKA and the Faculty of Social Sciences and Humanities whilst Wisma UNIKEB and the Faculty of Economics and Management only provided one handrail on the side of the ramp. The ramp surface at PUSANIKA is unstable and slippery as compared to the ramps at the other buildings that were stable and not slippery.

V. DISCUSSION

Disabled facilities provided at a place should include the input and consent of the disabled to ensure the facilities meet their needs. Bodaghi and Zainab (2012) in their study found that there are differences of opinion between architects and disabled users regarding the facilities provided, especially the pathways or ramps and in-house layout of the library where their study was conducted. In the opinion of architects, the facilities provided are in good condition, but for the disabled user, the facilities provided are inadequate. In this case, there is a need for mutual understanding between the facility provider and user to ensure that the facilities provided are easily accessible as well as comply with the structural specifications that have been set. At PTSL UKM (the library), only one disabled parking was provided, even though the area is a focal point for students. Similarly, toilets for the disabled are only available on level 4 of the building. It is common knowledge that individuals with physical and visual disabilities face difficulties in moving. Thus, ideally the number of both facilities should be increased and provided at a building level that can be easily accessed by the disabled.

From the observations made, the signage and direction of the facilities for the disabled are still lacking. For example, at the toilets. Disabled toilet signage are only stuck on the front of the toilet door. This will confuse disabled users whether the facility is available or not at the area. The researchers recommends that specific signage and directions to disabled facilities are provided at the foyer and parking area of every faculty building and other resource centres to facilitate the movement of PWD at the buildings.

The efforts already carried out to provide disabled facilities are commendable. However, to what extent are these facilities fully accessible to disabled users? As an example, disabled toilets. Most of the doors at disabled toilets open inwards or outwards which will certainly make it difficult for the disabled using wheelchairs. Lifts provided also lack a sound system that announces their level. This makes it difficult for the visually impaired to use lifts on their own and if there is an absence of braille lettering on the control buttons, it will be even more difficult. Facility providers should provide comprehensive facilities starting from the construction phase up to ensuring the accessibility of the facilities for PWD. The findings of the study is seen as a guide to the management of UKM to provide easily accessible facilities to the disabled based on the criteria set out in a universal design building. More attention to disabled facilities in UKM is needed as the UKM Bangi campus is made up of older buildings that require a lot of renovation to improve the facilities for the disabled.

A study was carried out to identify the factors that influence the improvement of disabled facilities at hospitals [15]. These factors appear to be applicable in other places as

well. Among the factors are: i) regular maintenance to ensure the facilities are functioning properly, ii) provision of disabled facilities beginning from the construction phase of the building, iii) the role of the government in ensuring an area is PWD friendly and is fully accessible, iv) more barrier-free facilities in public places to avoid the constraints faced by the disabled as well as, v) the role and perception of society to cooperate in ensuring that the facilities provided are always in good condition.

The awareness of equality rights for PWD especially in terms of access to the physical surroundings should be nurtured from the beginning in particular among professional practitioners involved in the construction sector such as architects and contractors. This is because they are the individuals responsible for the construction of a building. Realizing this, Universiti Islam Antarabangsa Malaysia (UIAM) has created an elective subject, 'Barrier Free Architecture' that can be taken by architecture students at the university. This subject is seen to provide insight to future architecture graduates on the concept of barrier-free, design for all, universal design and inclusive design [16]. Such subjects should be introduced in every institute of higher learning to expose all students to the needs of PWD.

In addition, the government, especially the municipal councils, should take the initiative of increasing the number of staff responsible for approving and supervising the construction of a building. This is because there is still a shortage of staff with expertise in the universal design code of practice [17].

VI. CONCLUSION

In conclusion, it can be seen that there are basic facilities needed by PWD at several faculties and student resource centres in UKM. However, these facilities are not enough and do not fulfil all the specifications outlined by universal design criteria. Therefore, the university is recommended to formulate an action plan that is more comprehensive and introduce an inclusive policy for PWD to preserve the rights and needs of the disabled. Everybody including management, students, educators and staff at public institutes of higher learning need to be more aware of the needs of the disabled and strive to fulfil their rights in the same way as others. In addition, maintenance of existing facilities should also be undertaken on a regular basis so that the wellbeing of PWD at the university including students, staff and visitors is completely guaranteed. In short, various parties at all levels of the university should play a proactive role in providing fully accessible facilities for PWD.

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