Awareness of Universal Design among Architecture students in POLISAS

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Abstract

The considerations towards inclusive built environments become prominent nowadays. The development of awareness and implementation on universal design starts to growth. However, universal design not yet regarded universally as a fundamental principle in all design. The provision and design considering all types of user differences starts to growth. It has therefore become necessary for architects and designers to consider these needs when working within their profession. The purpose of the study in this paper is to evaluate the level of knowledge and familiarity on universal design among students architecture in POLISAS, to know the willingness of students in learning universal design topic and to find out the best way how to teach polytechnic students in Architecture course about universal design. This quantitative study was carried out on 155 students from architecture programme in POLISAS. The participants are from semester 1 to semester 5. The questionnaire was distributed at the beginning of the new semester of December 2017 session. From the result, it shows that the knowledge and familiarity of the respondents about universal design very low where the result of percentage below 50%. The comparison of knowledge about Universal design among student between semesters also being analysed. However, when students reach higher semester, it shows that, the level of knowledge about universal design is increased. Survey result also shows positive attitudes among most students to learn a new topic, and most of them prefer to learn this topic through movies (32.4%) and animations (24.8%) for better understanding and experienced. This suggests that architecture students viewed the universal design as the important topic that they should be exposed and learn for a better experience and their future practice.

Keywords: Universal Design, Architecture curriculum, Built Environment

1. Introduction

Universal Design is referring to the inclusive design. Universal Design seeks to provide improved accessibility and safety for all groups in the community. It recognizes that improved accessibility enhances the value of buildings and its built environment. Design for all also a part of a Universal Design. Universal design covering from the design of products, environments, and communication to be usable by all people, to the greatest extent possible, without adaptation or specialized design. Universal Design means the design of products, environments, programmes, and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design and shall include assistive devices for particular groups with disabilities where this is needed (Hazreena Hussein, 2012).One of the most commonly related to all people in daily life is the built environment. In Malaysia, the awareness of Universal Design in built environment starts in the late 80's. In addition, it is important to promote awareness among students since Students in their late teens and early twenties are often unaware of the level of disability in society as the user groups are often an invisible population in society (Jim Harrison, 2015).

2. Approach of Universal Design in Built Environment Education

Education of future professionals is obviously one effective way to achieve this, but might be frustratingly slow if this is to take a new generation to become fully established (Jim Harrison, 2015). Identifying and finding ways of removing the barriers, attitudinal as well as physical, is then a priority area. According to Bernadi (2010), universal design requires an understanding and consideration of the broad range of human abilities throughout the lifespan. Creative application of that knowledge results in products, buildings, and facilities that are usable by most people regardless of their age, agility, or physical or sensory abilities (Design, 2008). According to Yiing (2013), built environment should be designed to cater for Persons with Disabilities to promote universal accessibility.

As mentioned by Anstead (2016), Universal Design is intended to be inclusive, not exclusive. Universal design is the idea that everyone should have access to everything all of the time and the impact it has had on the design of the home, workplace, transportation, communications, computers, furniture, products and services to meet the needs of a large audience as possible. The exposure of universal design is very crucial especially in built environment education mostly in architecture study. As the students from the architecture course will involve in designing, construction and providing a better-built environment for all, it is important for them to know and learn about universal design

(Burgstahler, 2012). However, according to Hitch (2016), there are few the research or studies being published related to the inclusive design or universal design curriculum in architecture at diploma level. (Helen Larkin, 2016) also suggested that the understanding and awareness of the attitudes of architecture students towards inclusive and universal design can help to form the relevance curriculum, through the emphasizing any misconceptions of their understanding. (Azmahani A. Aziz, 2012) Also stated that, teachers and lecturers should change their style of teaching approach in order to maximize students understanding and to make process of learning interesting for the students.

In 1989, Mace established the Centre for Universal Design at North Carolina State University (The Centre for Universal Design, 2008). From the Centre, seven principles of universal design were established for application to product development and are displayed in Table 1. In addition, Table 2 shows the development of Universal Design in Malaysia.

2.1 Problem Statement

Universal design is a design principles and approaches that offers design that can be enjoys and access for all types of peoples including disable people. People with disabilities have a right to, and want to enjoy travel and leisure experiences. However, their travel experiences are still characterised by transportation constraints, inaccessible accommodation and tourism sites, and inadequate customer services. Since the approaches of universal design in Malaysia still new but become one part of important topic in built environment, it is a critical effort in order to know the level of knowledge of architecture students in POLISAS about universal design topic.

2.2 Aim of Study

Given that the intent of the project was to attempt in evaluate students understanding and awareness towards Universal Design influence the attitudes of architecture students in POLISAS, this quantitative study aimed to measure the attitudes and familiarity regarding universal design literally. The objectives of the study in this paper is to evaluate the level of knowledge and familiarity on universal design between polytechnic students also the willingness of students in learning about universal design.

3. Research Methodology

The survey was carried out on 155 students from architecture programme in POLISAS. The participants are from semester 1 to semester 5. The questionnaire was distributed at the beginning of the

new semester of December 2017 session. They were chosen by stratified quota sampling on the basis of their class. The survey was conducted by using questionnaire survey in which the questionnaire are the same for all respondents (Krathwohl, 1997). The questionnaires used were the modification from the questionnaires titled 'An exploration of the attitudes of architecture students to the universal design of built environments' that was developed by (Helen Larkin, Students' Attitudes to Universal Design in Architecture Education, 2016). The modification was done according to appropriateness of the respondents' target group. The survey consist of two (2) parts. For the part 1, the questionnaires in respondents' demographic (gender, age, family status, and occupation); Section B: knowledge and familiarity about universal design and question related to the willingness of the sample to study or to learn about universal design. A 5-point Likert scale as rating indicators was used in the survey form to measures the respondent's strength of agreement. Likert score of 5 indicated a "Strongly agree" with the questions given.

4. Data Analysis and Findings

The discussion in this paper is divided into two sections: respondents' demographics; and the students' knowledge on universal design and their willingness to learn about universal design. Quantitative demographic data obtained from the questionnaire were analysed using descriptive statistics to summarise the characteristics of each sample. Categorical data (e.g. sex and group) were analysed by total number and percentage of a given response. The statistical analyses were conducted using SPSS version 22. Table 1 shows results of the survey.

4.1 Section A

Table 3 shows the demographic result of the respondents. From the tables display that more than half of the respondents' ages between 18-20 years old which cover 56.1% from the overall respondents, since that the intake of students into the polytechnic come from the students that finished from secondary school (SPM holder). Respondents that ages between 21-22 years old cover 31% of the total respondents, it can be said that this contributed by the students that come from the community college graduates. In terms of gender, female students are more than male students which cover 54.8% of total respondents compare only 45.2% of the respondents are male students.

Under the education level category shows that students from SPM holder are the highest which cater to 60.6 % of the total numbers of respondents, following by the community college graduate that cover 33.5%. This data reflects back to the percentage of the ages at the beginning of the table. In term of the living setting, most of the students or respondents are live in the small city area that covers 39.4%, followed

by the respondents that live in rural area. Meanwhile, the number of respondents that live in the big city only covers about 23.3% and only 7.1% of the respondents are live in town. This result will be used later in comparing the level of knowledge of students about universal in the next section.

In term of living setting, most of the respondents are living in the small city are that cover 39.4% of the overall percentage. Still, the numbers or percentage of the respondents that are coming or living in the rural area are slightly less than from small city area. The percentage for the students that are live from rural area holds about 30.3% and followed by the students that living in the large city that shows 23.2% and lastly only 11% students that live at town are. The living set will be used in comparing the data gain from the survey either it influenced the level of knowledge of the students or not.

4.2 Section B

In this section, students' are being asked the simple questionnaire regarding their familiarity and knowledge about universal design. Figure in Table 4 illustrates the results of the survey.

Question 1: Do students know and aware about universal design?

Descriptive statistics were calculated for question relating to reported familiarity with the Universal Design. For the questionnaire on familiarity with universal design, the 3-point Likert scale is denotes with 1 "*I have never heard of universal design*", 2 "*I have heard of universal design but not sure what it is*", 3 "*I am familiar with some principles and approaches on universal design*". Frequencies and percentages of scores for this question are presented in Table 4. From the result shows that the knowledge and familiarity of the respondents about universal design very low. Response Not Sure was the most frequently chosen response with 46.8% of overall participants. This somehow arises may be due to the confusion of the term used. Universal Design rarely used or explain to the students by the lecturer, and some of the people also referring to universal design as barrier-free design. The respondents that know and familiar with universal design only 14.9%, however, the respondent that do not know and no idea about universal design are higher which take 38.3%. According to the (Burgstahler, 2012), the concept of universal design developed from the field of architecture, when Ronald Mace challenged conventional design approaches and provided a design foundation for products and environments that were more usable and accessible. This data also shows that there are no significance to living setting factors that influence students' level of knowledge.

In addition, using the same questionnaire's result, the comparison of knowledge about Universal design among student between semesters also being analysed. Based on the survey result shows in Table 5, the level of knowledge about universal design are fluctuated. However, when students reach higher semester, it shows that, the level of knowledge about universal design is increased. On the other hand, the result shows the level of unfamiliarity about universal design are reduced when students reach higher semester. Hence, respondents that still hesitate and uncertain about universal design still at highest percentages among overall result.

Question 2: Are you willing to learn about universal design topic?

The willingness of the respondents to learn about the topic of universal design is shown at Table 6. From the table it shows that positive attitudes among students. Most of the respondents are willing to learn a new topic. This suggests that architecture students viewed the universal design as the important topic that they should be exposed and learn for a better experience and their future practice. Hence, there are 25 respondent that are already familiar and know about universal design are excluded from answering the question from this section.

Furthermore, the comparison of the willingness to learn universal design among semesters also being made by using same result from the question 2. From the Table 7, it demonstrates the result of the comparison of willingness. From the data, it displays that the level of willingness is higher among the students from semester 2 and 4. It can be assumed that both semesters (semester 2 and 4) are from June intake, and the rest of other semesters (semester 1, 3 and 5) are from December intake.

3.3 Section C

In Section C, students were asked what is the best method or medium that they think the best to use in order to learn Universal Design. For the question 3 is multi response questionnaire. The data of the survey from this section are illustrated in Table 8.

Question 3: Learning about universal design will be interesting through.

According to the Table 8, students or respondents mostly prefer to learn about Universal Design through an informal method which is movie that covers 32.4% from the response and followed by learning through animation, that caters 24.8%. Furthermore, students choose to learn Universal Design through magazines or comic which accommodate 17.6%. Formal syllabus and others compete at 10.8% and 10.4%. Lastly, storybook becomes the last choice of the students as the method of learning about Universal Design.

5. Discussion

Based on the survey and results, it found the level of awareness and knowledge of architecture students in POLISAS is still below level. This somehow arises may be due to the confusion of the term used. Universal Design rarely used or explain to the students by the lecturer, and some of the people also referring to universal design as barrier-free design. The survey result also display that the level of knowledge about universal design are fluctuated. However, when students reach higher semester, it shows that, the level of knowledge about universal design is increased. On the other hand, the result shows the level of unfamiliarity about universal design are reduced when students reach higher semester. It may seem obvious that there is a need to present teaching modules devoted to universal design as part of any design course and, although well-intentioned in principle, there are, the writers believe, good reasons for not doing this. Perhaps the strongest argument for this is that, in singling it out as a specific topic, it will tend to reinforce the attitude that it is somehow separable from regular design. As being suggested by (Bernardi, 2010) there are advantages in modular courses for many disciplines, it is counter to the way in which architectural design is best taught. In addition, in embarking on any awareness-raising exercises. It can be telling to ask students to state their preconceptions of UD, access and disability, before embarking on any activity or discussion.

Students also have positives attitudes towards the willingness to learn on universal design topic. This was highlighted through the responses to the willingness to learn universal design question. Positive attitudes were noted on more than 50% of response that giving answer 'Yes' to the question. This findings supports the continued inclusion of universal design teaching as valuable aspect of curriculum within architecture higher education.

Further observation on the best method that choose by students to learn universal design. From the data, most students prefer to learn through

movies and animation. As suggested by (Azmahani A. Aziz, 2012), lectures should switch their teaching styles paradigm from surface approach to deep approach. The more realistic experience could bring students perspectives and understanding to the maximum and lead them to more likely enjoy their task and learning process also become more involved.

6. Conclusion

Students' awareness and knowledge can be one of the important factors to create better built environment especially inclusive built environment. This study is the first to assess architecture student knowledge and awareness related to universal design, and the enthusiasm of students to be exposed or learn new topic. From the study, it is clear to answers that the level or awareness and knowledge of architecture students in POLISAS is still at low level. Still, it not a reason that the lectures should stop from introducing and promoting and universal design. Even there is existing research that have being done on the implementing universal design in the teaching process. Thus, this topic also should be integrated in the syllabus and curriculum in polytechnic system. The more interesting approach of teaching and learning techniques also should be promoted, and the learning process must be not only focused in the classroom.

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Appendices

Table 1: Principles of Universal Design

Principles	Description
Equitable use	The design is useful and marketable to people with diverse abilities
Flexibility in use	The design accommodates a wide range of individual preferences and abilities
Simple and intuitive use	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level
Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
Tolerance for error	The design minimizes hazards and the adverse consequences of accidental or unintended actions
Low physical effort	The design can be used efficiently and comfortably and with a minimum of fatigue
Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture or mobility
Source: Adapted from Connell et al., 1997. Copyright 1997 by the Centre for Universal Design	

Table 2: The development of Universal Design in Malaysia

Year	Development
late 1980s	The development of Malaysian Standards and code of practices were initiated, and 3 Standards was published in the 1990s, which are MS 1183:1990, MS1184:1991 and MS 1331:1993. Malaysia has started to address the needs of People with Disabilities (PWD) in the built environment.
2000	International Islamic University Malaysia (IIUM) was invited to conduct barrier-free workshop at Pan Pacific Hotel, Kuala Lumpur to train for their technical staff. The second workshop was held in KLCH headquarters, which later was followed by a series of other workshops.
2002	Malaysia, as a member of the United Nation Economic and Social Commission of Asia Pacific(UNESCAP).
2002-2003	Malaysia, as a member of the United Nation Economic and Social Commission of Asia Pacific(UNESCAP).
2008	KAED Universal Design (KUDU), IIUM conducted access audits in various building typologies in Malaysia such as transportation hubs, waterfront facilities, shopping complexes, markets, heritage buildings, housing, and jetties to identify the level of accessibility in these public buildings and spaces. it was found that only 25% of buildings in Malaysia were considered good in terms of accessibility.
2011	Joining a smart partnership with the Department of Standards Malaysia was taken by KAED Universal Design, to promote Malaysian Standards related to universal design and accessibility in the built environment to local authorities, professionals, academicians and the mass public through access audit workshops, international conferences, and national universal design product competition.
2014	The latest Malaysian Standards (MS 1184:2014) are developed

	through consensus by committees. MS1184 is made mandatory by regulatory authorities. This document was prepared to include with the latest standards, data, and information to accommodate persons with disabilities (PwDs), the aged and children in various building typology such as heritage, parks and other public spaces.

(Source: (Asiah Abdul Rahim, 2013)

Table 3: Demographic

Variable	Categories	n	%
Age	18-20	86	56.1
	21-22	48	31.0
	23-24	19	12.3
	25 Above	1	0.6
Gender	Male	70	45.2
	Female	84	54.8
Education level	SPM	93	60.6
	Community College	52	33.5
	Others	9	5.8
Living Setting	Large City	35	23.2
	Small City	61	39.4
	Town	11	7.1
	Rural	47	30.3

Table 4: Familiarity and knowledge of the respondents about Universal Design

	Response	n	%
1	I have never heard of universal design	59	38.3
2	I have heard of universal design but not sure what it is	73	47.1
3	I am familiar with some principles and approaches on universal design	23	14.9
Total		155	100

Table 5: Comparison level of knowledge and Familiarity on Universal Design between semesters

	I have never heard of universal design		I have heard of universal design but not sure what it is		I am familiar with some principles and approaches on universal design		**Total**
	n	%	n	%	n	%	**n**
Semester 1	17	48.6	12	34.3	6	17.1	**35**
Semester 2	10	31.3	21	65.6	1	3.10	**32**
Semester 3	12	41.4	11	37.9	6	20.7	**29**
Semester 4	12	40.0	15	50.0	3	10.0	**30**
Semester 5	8	28.6	13	46.4	8	28.6	**29**
Total	**59**		**72**		**24**		**155**

Table 6: Willingness of the respondents to learn Universal Design

Response	**n**	**%**
Yes	67	51.5
No	7	5.40
Not Sure	56	43.1
Total	**130**	**84.4**

Missing	25	15.6
Main total	**155**	**100**

Table 7: Comparison of the willingness of the student to study or to learn about universal design between semesters.

	Yes		**No**		**Not Sure**		**Total**
	n	%	n	%	n	%	n
Semester 1	13	37.1	7	20.0	15	42.9	**35**
Semester 2	17	53.1	4	12.5	11	34.4	**32**
Semester 3	13	44.8	8	27.6	8	27.6	**29**
Semester 4	16	53.4	4	13.3	10	33.3	**30**
Semester 5	9	31.0	8	27.6	12	41.4	**29**
Total	**68**		**31**		**56**		**155**

Table 8: Medium or Method to learn Universal Design.

Method of Learning	Responses	
	n	%
Formal Syllabus	24	10.8
Animation	55	24.8
Magazines / Comic	39	17.6
Movie	72	32.4
Story Book	9	4.1
Others	23	10.4