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IMPACT OF ARCHITECTURAL DESIGN STUDIO PROVISION ON STUDENTS' CREATIVITY: AN INITIAL FINDINGS

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Abstract

The role of the architecture design studio is fundamental in architectural education, where both students and educators are using it as a learning and teaching space to explore and entice the architecture students' design creativity and construction technical knowledge in developing decent architectural design outputs. Though there are assumptions by some individuals that a physically enhanced and beautiful studio facilities will influenced positivities, instead this research is focussing in investigating the actual contributing factors that could actually assist us in understanding attributes of a good architectural design studio that could preparing students to be more creative therefore producing better and great architectural designs. A set of questionnaire adopting the five-scale Likert Scale, a direct observation, and open-ended interviews were the data collection strategies used to measure the responses of 35 second-year architecture students at the School of Housing, Building, and Planning (HBP), Universiti Sains Malaysia regarding their thoughts of their own studio, and also the grades they achieved were checked. Initially, findings show that the current state of the HBP's design studio (located in a building built in 1973) did not really affecting the students' grades negatively as their range of grading achieved were between an A, A-, B+, and the B's. This study also found that many of the students are satisfied with the current existing state of the architecture design studio provided at HBP, however, continuous maintenance and improvement of its general facilities is encouraged, perhaps for greater future outcomes.

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Keywords: Architectural education, creativity, design studio, studio facilities, learning space.

1. Introduction

There are several number of established and accredited with both the Lembaga Arkitek Malaysia (Board of Architects Malaysia) LAM Part I & II status public universities offering architecture courses in Malaysia, and they are Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti of Malaya (UM), Universiti Teknologi MARA Puncak Alam (UiTM), Universiti Kebangsaan Malaysia (UKM), International Islamic University of Malaysia (UIAM), and Universiti Putra Malaysia (UPM). While, in the private wings, they are two universities accredited with the LAM Part I & II, i.e. Taylor's University, and UCSI University Kuala Lumpur (UCSI).

Each university has their own ways in nurturing and preparing their architecture graduates within their own facilities design, and arrangement of their architecture design studios capacities. Even though both these public and private universities are different in the aspects of facilities they can provide, however, all universities still are subject to obey the guidelines of the minimum standard steered by the Majlis Akreditasi Pendidikan Senibina Malaysia (MAPS) (Council of Architectural Accreditation and Education) when preparing for their curriculum and syllabus (LAM, 2019). Besides the curriculum and syllabus, there is a guideline set in the manual of MAPS for the provision of minimal required learning spaces (including the architectural design studio), however, the manual does not impose on any '*cosmetic elements*' to be provided in their effort to secure for the accreditation.

Therefore, as mentioned earlier in the abstract, this research is not designed to challenge an assumption by some individual (involved in the industry of providing architectural education) that a physically enhanced and beautiful studio facilities would (probably) influenced positive results (a better grades perhaps from increased creativity and good presentation boards?), however, this research is setup to investigate the actual contributing factors that could actually assisting in the understanding of finding the attributes of a good architectural design studio that perhaps could help architecture students to produce a creative and great architectural designs, at least for those studying at the Malaysian institutions offering architecture courses.

1.1. Brief review on Malaysia's architectural education

Architecture is an order which makes reliable, decent and tasteful spaces for the clients utilizing the chances of the native habitat to fulfil the necessities and wants of the clients inside specific measure (Dizdar, 2015). Architecture is also one of the oldest and the most significant branches of education that started early throughout all countries in the world. It is in fact a multi-faceted field of studies because of the unpredictability of the social and cultural aspects that influenced it (Ibrahim & Utaberta, 2012). In Malaysia, architecture education formally started after the person finished his/her secondary school and then enrolled into any architecture programmes offered either in the public or private colleges, polytechnics, or universities. To control these institutions to offer a good programme, there is a body under the jurisdiction of Lembaga Arkitek Malaysia (LAM – The Board of Architects Malaysia) known as the Council of Architectural Accreditation and Education Malaysia (MAPS) that has the statutory authority to monitor the learning journey at all institutions. MAPS make sure that all institutions to obey and follow the rules and regulations then only it can be accredited or recognised (LAM, 2016). Besides the MAPS and LAM, there is also another important organization that play complimentary roles in Malaysian architectural education,

i.e. the Pertubuhan Arkitek Malaysia (PAM – The Malaysian Institute of Architects). The LAM is a statutory expert dependable in deciding the standard for passage into the architectural profession and the accreditation of a program of architecture study. While, the PAM has a standing board of trustees on training and plays a functioning job to organise, encourage, and advance the quest for perfection in architectural education in Malaysian institutions.

1.2. Behaviour modification

In many architecture programs, students spent much of their times (approximately in between three to five hours a day) working on their design project in the design studios. Students have to put tremendous time and efforts to produce creative design. As an architecture student, ones must also has an iterative behaviour. Iterative behaviour is needed in the architecture studio learning because it helps to assist in the development of critical thinking and better design ideas. The process of iterative behaviour in design process (Figure 1) is visualised by Wever, van Kuijk, and Boks (2008) who studied the iterative process that incorporating the user-centered design process with human-computer interaction, and the basic design cycle (proposed by Roozenburg & Eekels, 1995).
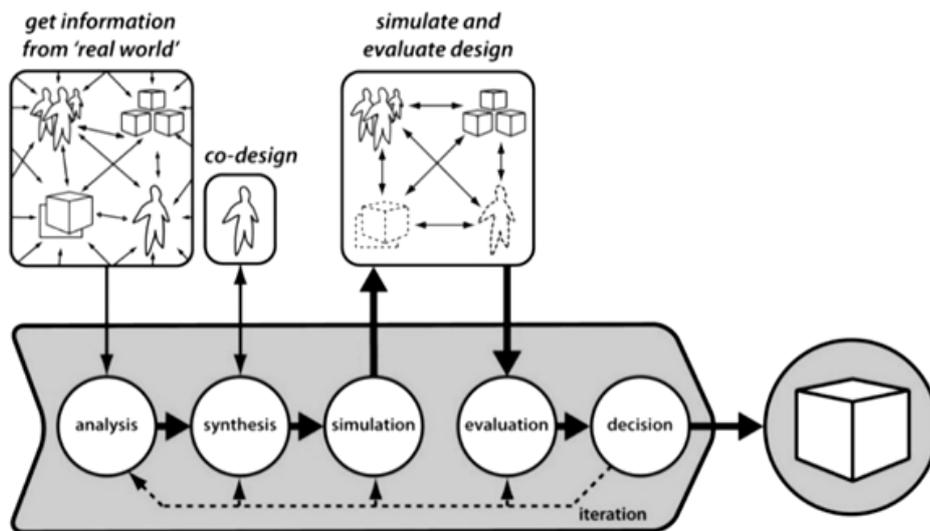

Figure 01. The iterative behaviour process visualised by Wever, van Kuijk, & Boks (2008)

1.3. Behaviour modification

Many architecture students called their design studios 'home' because of the amount of time spent in the studios compared to their own homes or hostels. A lot of things happened in the design studio; besides working on their design projects, such as eating, hanging around, playing, studying, and even sleeping (Popov, 2003). As stated by Gifford (2015), the sum and course of action of space are essential for classroom performance and related practices. Space organisation is an essential job in assisting decision making by human. Whilst learning is the basic exercises that need to take into consideration of many factors, it is also influenced by the spatial arrangement where the learning process takes place. Therefore, a comprehensive and accommodative spaces designed specially for a design studio is a must since it is not

an ordinary classroom. Design studios need to be practical and colourful to accommodate different activities to happen to assist in increasing academic achievement. A design studio must also provided with a comfortable and stimulus environment to support the learning activities (Basa, 2010). Supporting the claims by Gifford (2015), Basa (2010), Hassanpour, and Utaberta (2011) added that architecture education has its own unique curriculum, and its curriculum always reflected on the design studio where dynamic learning frequently happens through grouping or individual problem-based learning processes.

1.4. Studio environment related to student's achievement

Cole, Sugioka, and Yamagata-Lynch (1999) mentioned the four essential characters of environment that could foster creativity; (i) personal teacher-student connection, (ii) valuation, (iii) ingenuousness, independence of choice, and (iv) classroom accomplishments. These four categories were found to capture the active connections taking place in the classroom. One of the environments characters in architecture education is the learning style. Learning styles are proven to be significantly relevant to academic performance. Kvan and Yunyan (2005) identified that there is a critical relationship between learning style and student's academic performance, specifically in the architecture design studios.

2. Problem Statement

An architecture design studio is fundamental in architectural education (Ibrahim & Utaberta, 2012). Architectural educational programs have been founded on the basis of working around the "learning by doing" pedagogy conducted in the design studio through demonstration, and other teaching and learning approaches. Undeniably, also based on the authors experiences, working in an architecture design studio offers fantastic communication, multi-tangible, student-focused, constructivist, and providing experiential problem-based teaching environment as stated by Kurt (2009). According to Dizdar (2014), students learned, acquire knowledge, and gain essential understanding related to architecture whilst working in the architecture design studio provided at their institutions. Additionally, Ibrahim and Utaberta (2012) state that students share their thoughts, and design ideas during the corresponding processes (design discussion and/or critiques) in the studios, in which at later stage they would be able to express their creativities through illustrations, making a physical models, three-dimensional computer models, photography, videos, and other presentation styles or mediums. Sidawi (2013) notes that the design studio is core in architectural learning and the positive studio culture will have a positive effect on student activities and tutoring, communication, and interaction. So, the problem that this research paper is trying to address is how can the already complex setting of one architecture design studio can assist to develop creative outputs work of architecture?

3. Research Questions

Taking the Torun and Esin (2011) thought, the architecture design studios are usually the central place of an architecture programmes, where students are introduced to many new approaches and thinking for considering the world from a more active perceptions, borderless, minimal limitations; advance, developed, and critically justified. So, revealing the design studio as a very importance (and sacred) in an

architecture programs [also at the School of Housing, Building, and Planning (HBP), Universiti Sains Malaysia (USM)], therefore two questions arise:

3.1. …is the provision of an architecture studio being conducive to improve architecture students' creativity?

- *Frankly, it is a very tough task to determine nor to evaluate the improvement in creativity of an individuals. However, this study will analyse the performances of each respondents in term of the final gradings the students achieved during the semester 2 (at 1st year studio), and semester 1 (at 2nd year studio);*

3.2. …what are the attributes of a studio (to be provided) to support the improvement of current batch of architecture students' creativity at the HBP?

- *The respondents used to be in the HBP's 1st year architecture studio that has lesser decorations, furniture, and style. However, (when they are in) the 2nd year architecture studio was upgraded into a more decorative and stylish with better and more furniture provided.*

4. Purpose of the Study

The main purpose of this study is to identify the key factors of instead this research is focussing in investigating the actual contributing factors that could assisting us in understanding attributes of a good architectural design studio that could preparing students to be more creative therefore producing better and great architectural designs. Since the design studio is a core of architectural studies, there might be some other key factors that can encourage students to fully use the space (and becoming increasingly creative) such as the facilities available in the studio – studio size, natural and artificial lightings, well ventilated; the present of peers, lecturers, the seniors; or perhaps the studio environments or ambience – the neatness of studio, and nice layout of furniture, etc.

5. Research Methods

The study was performed using both the qualitative and quantitative methods (mixed methodology) (Groat & Wang, 2013), where questionnaire distributed, interviewed conducted, and direct observation on the studio facilities were made. The questionnaire was designed to employ the five-scale Likert Scale to measure two dimensions; firstly, is to measure the basic understanding of the use of the design studio by the students, and secondly, is to evaluation and understand the attributes that could contribute to the improvement in creativity using architecture design studio. The respondents were selected of 35 second years architecture program students from the School of Housing, Building, and Planning (HBP), Universiti Sains Malaysia, Penang. The survey was done on the second semester of the academic session 2018/2019. All the data collected were then analysed using the SPSS programme before the data were then translated into a graphical table and figures.

6. Findings

As an introduction to the initial survey information, from the total number of thirty-five 2nd Year HBP architecture students responded to this initial survey, the largest age group of respondents is in between 20 to 21 years old (77.1%), and they are 20 (57.1%) female students and 15 male students (42.9%) out of the 35. For their methods of entry into the Bachelor Science (Hons) H.B.P (Architecture) at the HBP, 42.9% entered USM with their Malaysian Matriculation results; another 22.9% holding a Sijil Tinggi Pelajaran Malaysia (STPM); and some 17.1% already possessed a Diploma in Architecture from local polytechnics and collages (Table 1).

Table 01. The research respondents' information

	Total No.	Description	Frequency (%)
Entry Method to HBP-USM:	*...the same 35 (100%)*	Matriculation	**17** (48.6%)
		STPM	**10** (28.6%)
		Diploma in Arch	**2** (5.7%)
		Other qualifications	**6** (17.1)
Genders:	*...the same 35 (100%)*	Male	**15** (42.9%)
		Female	**20** (57.1%)
Age groups:	*...the same 35 (100%)*	19 years old	**1** (2.9%)
		20 years old	**14** (40%)
		21 years old	**13** (37.1%)
		22 years old	**4** (11.4%)
		23 years old	**1** (2.9%)
		24 years old	**2** (5.7%)

To get the most accurate information regarding the studio subject gradings of each students (respondents), the marks tabulated by the both studios Coordinator (Studio Master) i.e. for the RAS102 (conducted during 1st Year, 2nd semester), and the RAS203 and RAS204 (conducted during 2nd Year, 1st & 2nd semesters) were extracted. From the tabulation of markings shown in Table 2 below, the results show that the majority of those students who achieved excellent grades (A- to A) results in the architecture design studio subject (RAS102 and RAS203) are from both the group of diploma and matriculation certificate holders, with some minority from the group of a students with either the matriculation or STPM certificate holders. The achievements of an A- and A among these diploma and certificate holders did show that experiences and prior construction technical knowledge do affect the level of creativity, and the completeness level of the output. To add to the point of argument, majority of the respondents with good grades produced the studio works from their hostel rooms – not the studio, except for one person i.e. Respondents No.15 with a matriculation background. Consequently, the assumptions that a physically enhanced and beautiful studio facilities will influence positivities is challenged to be not too accurate by taking this as a fact. For further information, the 2nd Year Architecture Design Studio has just get renovated of its floor, walls, and other fixtures are much better and bigger in size to compare to the 1st Year Architecture Studio at HBP. Also, from Table 2, it does show the declining trends of students from achieving grades A and A-. During the execution of RAS102 they were 5 achieved grade A, and 14 respondents who achieved A-. While, during the RAS203, it is now only two respondents scored A-. The

same thing happened during RAS204 where still only two respondents achieved an A-, when Respondent No.30 getting a Fail (D-) mark.

Table 02. Record of markings obtained by the respondents for RAS102, RAS203, and RAS204

| No. | Respondent ID | 1st Year: 2nd Sem. | | 2nd Year: 1st & 2nd Sem. | | | |
| | | Academic Session 2017-2018 | | Academic Session 2018-2019 | | | |
		RAS102	Grade obtained	RAS203	Grade obtained	RAS204	Grade obtained
1	Respondent 1	79	A-	66	B+	55	B
2	Respondent 2	66	B+	53	B-	62	B
3	Respondent 3	74	A-	59	B	53	B-
4	Respondent 4	71	A-	52	B-	64	B+
5	Respondent 5	56	B-	49	C+	50	C+
6	Respondent 6	59	B	47	C+	61	B
7	Respondent 7	80	A	66	B+	62	B
8	Respondent 8	68	B+	64	B+	68	B+
9	Respondent 9	69	B+	52	B-	55	B-
10	Respondent 10	79	A-	70	A-	60	B
11	Respondent 11	79	A-	48	C+	68	B+
12	Respondent 12	62	B	54	B-	56	B-
13	Respondent 13	67	B+	62	B	63	B
14	Respondent 14	72	A-	68	B+	62	B
15	Respondent 15	85	A	63	B	73	A-
16	Respondent 16	73	A-	70	A-	69	B+
17	Respondent 17	79	A-	67	B+	66	B+
18	Respondent 18	81	A	62	B	67	B+
19	Respondent 19	77	A-	57	B-	69	B+
20	Respondent 20	74	A-	55	B-	62	B
21	Respondent 21	68	B+	51	C+	52	B-
22	Respondent 22	71	A-	55	B-	59	B
23	Respondent 23	62	B	54	B-	47	C+
24	Respondent 24	71	A-	63	B	58	B
25	Respondent 25	57	B-	46	C+	46	C+
26	Respondent 26	74	A-	58	B	66	B+
27	Respondent 27	80	A	56	B-	51	C+
28	Respondent 28	75	A-	68	B+	61	B
29	Respondent 29	67	B+	51	C+	59	B
30	Respondent 30	60	B	43	C	27	D-
31	Respondent 31	67	B+	51	C+	59	B
32	Respondent 32	59	B	50	C+	49	C+
33	Respondent 33	63	B	52	B-	54	B-
34	Respondent 34	80	A	68	B+	71	A-
35	Respondent 35	69	B+	65	B+	53	B-

6.1. The pulling factors determining students' studio demand

It is recorded that almost half (45.7%) of the 35 respondents were using their design studio regularly and at the same time interval, and majority (54.3%) of the respondents used the design studio at night-time. Almost all (97.2%) of the respondents were found to attend to the design during the face-to-face consultation and during the critique sessions (during weekdays) due to its effects on their overall studio marks by the studio masters. However, many respondents seldom be at the studio over the weekends. So, when the answers obtained through the survey were analysed, Table 2 presents the appearance of the contributing pulling factors for respondents to use the design studio started to emerge, and the most significant answer was facilities provided by the studio, with most of the respondents scored M=4.11. The second pulling factor is the conduciveness of the studio environment as a place to work comfortably and effectively (M=3.74). Later, the availability of studio peers (M=3.54), and lecturers and tutors (M=3.03), are part of the pulling factors respectively. However, the availability of senior students (M=2.09) around the studio facilities is not really taken as important.

Table 03. The pulling factors in a student's tendency to use design studio

	Studio peers	Senior students	Lecturers and tutors	Conducive studio environment	Studio facilities
Mean score	**3.54**	**2.09**	**3.03**	**3.74**	**4.11**

6.2. Important characteristics and components as creativity inducers

From the questionnaire, most respondents were also asked to look into the important characteristic and the components of the design studio in which they think could encourage themselves to produce a more creative and innovative design. Altogether there are fourteen characteristics and components listed below that are according to respondents' preferences to assist them being more creative. The size of the design studio (and the size of the drawing tables) were agreed by the majority to be the most important components an architecture design studio should has. The least essential characters or components chosen is the availability of a pantry in the studio, but still in the higher part (Figure 2).

- Size of the studio = 100% respondents want it.
- Safety features, complete facilities and tools, attractive decorations, orientation of the studio tables, natural lighting, and cleanliness, tidy and well maintained = 97.1%.
- Latest high technology equipment, private working space, artificial lighting, air conditioning, and natural ventilation = 94.2%.
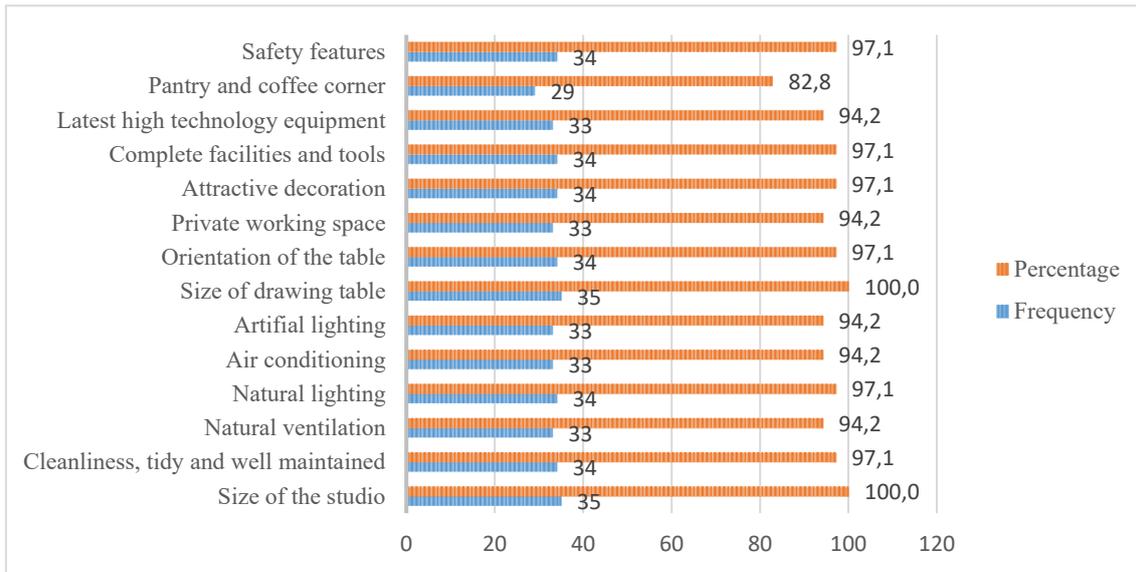- Pantry and coffee corner = 82.8%.

Figure 02. The most important characteristic and components of an architecture design studio

The respondents too highlighted, that they would be more grateful if the management of the School of HBP can consider and provide a pantry and/or coffee corner in each design studio.

6.3. Evaluation on the current architecture design studio facilities at the School of HBP-USM

Majority (97.1%) of the respondents appreciate the arrangements and the adequacy of the compulsory furniture for the teaching and learning (TnL) of architecture at HBP. Respondents claimed that they feel comfortable during the TnL sessions and can follow the teaching session well. The size of the studio (approximately 40.0 metres long x 10.0 metres wide x 3.0 metres high ceiling) that accommodated 56 students during that surveyed semesters has complied to the minimum standard space per student (5 metre square) set by the MAPS; therefore the respondents is studying comfortably in the design studio space that can actually accommodate 80 students at one time. Figure 3 shows the arrangement of furniture and the work-stations available in the 2nd Year studio at HBP.

94.3% of respondents further evaluated that the HBP architecture design studio has appropriately equipped with air-conditioners, working artificial lighting, adequate natural lighting, enough natural ventilation, and the design studio also provides the students with suitable personal workstations.

From the point of view of safety, some 80% of the respondents feel safe to be at the studio at any given time, and this must be from the availability of the USM's security department personnel making their safety and security checking routine rounds.

Figure 03. The arrangement of furniture and the working stations provided at the 2nd Year Architecture studio at HBP.

7. Conclusion

This study highlighted to answer two main questions i.e. what is the provision of an architecture studio being conducive to improve architecture students' creativity, and what are the attributes of a studio (to be provided) to support the improvement of current batch of architecture students' creativity at the HBP? As per discussed in the findings section, we found that the students whom has undergone Diploma in Architecture qualification, achieved better marks (grades od A- and A), compared to their colleagues who are fresh graduate of architecture when they enter HBP-USM. This condition is because these group of students already undergone 4 to 6 semesters of architecture learning; therefore, they already developed their knowledge and skills from the previous institution. Therefore, findings from this research paper can be used to support and at the same time also challenging the assumption by some individuals that a physically enhanced and beautiful studio facilities will influenced positivities. In fact, they are more than just a beautifully decorated spaces when it comes to the contributing factors for improve creativity amongst architecture students. The actual contributing factors that could actually assisting students to produce better and great architectural designs should still be studied though some of the attributes are the size of the studio, safety, complete facilities, attractive decorations, layouts, natural lighting, and cleanliness, tidy and well maintained, latest high technology equipment, private working space, artificial lighting, air conditioning, and natural ventilation, pantry and/or coffee corner for students to take a break.

Finally, we can conclude that a comfortable, and well-equipped architecture design studio with all the basic necessity an architecture design studio will be needed to assist in creating decent atmosphere for creative learning activities. Non-single elements will be the sole attribute for better creativity in architecture students.

Acknowledgments

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