

Effectiveness of Online Architectural Design Teaching: Perspectives of Students and Teachers

KNK Pathirana#, WAPS Kumara, T Mendis and KDHJ Premarathne

Faculty of Built Environment and Spatial Sciences, General Sir John Kotelawala Defence University, Sri Lanka

#kihanpathirana@kdu.ac.lk

Abstract— Design teaching is an important process and the core of Architectural education. It reflects the theoretical knowledge as well as practical knowledge while enhancing the sensitivities and lateral thinking of the students. This pedagogy facilitates exploring, experiencing, creating and team work based on cognitive, technical and social skills. Architectural design teaching traditionally relies on the face-to-face classroom educational system. As Covid -19 pandemic has impacted every field of society including education, most of the educational institutions, universities and schools throughout the world have switched to online systems. Accordingly, architectural education also had to adapt to online systems to some extent even without having teaching methods specifically designed for online architectural education. This research was conducted to find out the effectiveness of online architectural design teaching in the Sri Lankan context according to the perception of students and teachers. Qualitative data were collected using a researcher made structured questionnaire distributed among teachers and students attached to Sri Lankan architecture schools. The questionnaire was made based on five design teaching and learning methods, i.e. group discussions, tutoring, critiques, field visits and group work. The purposive sampling method was used to select the sample considering the experience in both face-to-face and online architectural design teaching. The size of the sample was 175 including both students and teachers. The data were analysed by using the software OriginLab in order to assess the participants' perceptions. The overall results show that more than twice as many respondents perceive online teaching to be ineffective in

comparison to those that are in agreement with its effectiveness.

Keywords: *architectural education, online architectural design teaching, effectiveness, perspectives of teachers and students, Sri Lankan context*

I. INTRODUCTION

Education is a field which is mostly affected by the current Covid 19 pandemic situation. Online teaching is becoming an essential part in every level of education from kindergarten to higher education due to the difficulty of relying on traditional teaching systems. However, it is uncertain that some of the areas of education which highly depend on face-to-face teaching such as Architecture, Dancing, Music, Drama, Painting, Sculpting, etc. could be effectively taught via online teaching. Most of the Architecture schools in the world have switched to online teaching even not having designed online teaching systems with them. After realizing that the education process cannot be further postponed, Sri Lanka also adapted to online systems in almost every field including Education.

All Architecture schools established in Sri Lanka have initiated online teaching without prior experiences or experiments of being totally online. Design is the core subject area in any Architecture degree course which is usually taught face-to-face in the studios. Therefore, an uncertainty about effectiveness of teaching and learning process arises regarding the core subject- Design.

The objective of this research is to find out the effectiveness of online architectural design

teaching in Sri Lankan context according to the perception of students and teachers.

II. BACKGROUND AND LITREATURE REVIEW

Online education has been widely spread all over the world. Sun, et al. (2016) has reviewed that online education has rapidly developed due to internet connectivity, advanced technology, and a massive market and specially for people who are unable to obtain education because of physical distance, schedule conflicts, and unaffordable costs. Most of the students choose online courses due to quality of course design, the creation of interaction and evaluation system (Tallent-Runnels et al., 2006). With emergence of Covid-19 pandemic situation, most of the countries focus on online education rather than the past. Suher (2020) states that Turkey Council of Higher Education has decided to use distance educational methods as an emergency model to carry out educational activities without interruption in universities. Most of the Sri Lankan universities including architectural education institutions have also adapted to online teaching without any prior experiences and advanced technology.

Architectural design teaching is an important pedagogical process in Architectural education. Chen, et al. (2012) identifies design pedagogy as project oriented and the core in architectural education. According to Parsons (2007) Architecture and design are traditionally oriented towards studio teaching and project based learning. Architectural design teaching is an active and more practical pedagogy more than theoretical process as described by Steino, et al (2012). It is learnt through practise hence it simultaneously involves making, creating, seeing, reflecting, and forming habits.

Design studio is a physical space and learning environment where students interact with teachers. It is the place where students are able to learn from teachers as well as from each other (Steino, N et al, 2017). In physical design studios, the mode of the instruction is one-on-one supervision and teachers discuss design projects with students. Architectural design teaching and learning is reflected through action (Schon, D, 1981). Afacan, (2016) argues that the online or virtual studio as it is often termed ideally involves a 'community' rather than isolated, one-

on-one communication. There should be an interaction and collaboration between learners and teachers to create online education effectively. (Sun, et.al, 2016)

Design studio education reflects visual, verbal, tactile, written assignments from various forms such as drawings, design reviews, group presentations and studio works. Teaching methods are individual critiques, group tutorials, and lectures. (Afacan, 2016). Design studio critiques helps to improve student's creativity, thinking process and techniques and optionally invites external jurors (practitioners and/or academics) to give their opinion and comments on the students' design work in progress (Ellmers, 2006; Krantz & Harris, 2013). The student should present precedents of architectural space and form, proposed design with plans, sections and elevations using appropriate scales, using of appropriate materials and construction techniques and physical 3D models in a design critique. (Afacan, 2016) Architectural design communicates through visual representations in the form of drawings, scale models and prototypes. These artifacts are traditionally physical – graphite and ink on paper, and models made from wood, cardboard, plaster and other materials – and therefore tangible (Steino, et al., 2017).

In the design studio, there are interconnections between the student and tutor. Design tutoring contributes to convey the implied knowledge to students through speaking, sketching and visual expressions (Boardfoot & Bennett, 2016). Socialization is another important aspect gained from physical design studio group works (Yurekli, 2003). Ke (2010) points out that "a group of students could dominate online discussion, thus intimidating others who were newcomers". Thus, traditional design teaching is arguably unique as a form of educational teaching methods compared to many other disciplines (Boardfoot & Bennett, 2016).

Online design studios have become a more attractive alternative to traditional studio teaching (Boardfoot O & Bennett R, 2016). According to Afacan (2016), Online or virtual teaching is a challenge and more difficult than in traditional classroom teaching. Suher (2020) emphasizes that online studios create important

opportunities and challenges for students related to their presentation and expression of work. Virtual pedagogy may produce changes in teaching and learning patterns and practices (Lopez-Perez & Rodriguez-Ariza, 2011). However, there are many advantages of online pedagogy, such as pedagogic richness, flexibility and cost-effectiveness (Graham, 2004).

Field visits are one of most significant teaching devices in the architectural curriculum and practical platform to understand the scale and proportions of a design, critical and inseparable part of the design process which help to analyse the environment, cultural and social aspect of the site (Trivir, 2016; Yurekli, 2003). Suher (2020) states that google earth or google map might have been easily supported for virtual site visits.

III. METHODOLOGY

The research was carried out using researcher made structured questionnaire distributed among 175 of participants who were selected using purposive sampling method considering the experience of both face-to-face and online architectural design teaching systems. Participants consisted of 114 students and 61 teachers including permanent teachers, visiting tutors, and examiners. Sample students were selected from three (03) leading architecture schools and other architecture related institutions since the students from one of leading architecture schools did not respond. Selected students represented all levels of study. The teachers/ tutors/ examiners represented all schools and belonged to different designations and groups of experience.

Table 01: Detailed summary of the total responses according to the institutions

Institute	No of Teachers	No of Students
Government University	18	36
Semi-Government University	12	60
Private University A	9	15
Private University B	16	-
Other	6	3

Total Responses	61	114
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Table 02: Detailed summary of the students' responses according to the level of study

Institute	Students Level of Study					
	Level 01	Level 02	Level 03	Level 04	Level 05	Other
Government University	2	5	22	1	3	3
Semi-Government University	5	18	6	15	11	5
Private University A	4	1	8	1	1	0
Other	-	-	2	-	1	-
Total Responses	11	24	38	17	16	8

Table 03: Detailed summary of the teachers' responses according to the role

Teachers' Role in Architecture Education	No of Teachers' Responses
Teacher	22
Tutor	18
Examiner	2
Teacher & Tutor	3
Teacher & Examiner	2
Tutor & Examiner	5
Teacher, Tutor & Examiner	9
Total Responses	61

The questionnaire consisted of 20 questions presented under five sections named following the main design teaching methods i.e. group discussions, tutoring, critiques, field visits and group works. Part A of the questionnaire

included general information of the participants. All questions in Part B were 5-point Likert scale questions asking the agreement/ disagreement of the each participant on each statement offered. Questionnaire was generated as a Google form and sent to the participants as emails and WhatsApp massages. the responses received were analysed by making use of the software OriginLab in order to assess participants' perception and viewpoint on the effectiveness of online teaching in architectural education.

IV.RESULTS AND DISCUSSION

Following the research design, and administration of the questionnaire, the responses received were analysed by making use of the software OriginLab in order to assess participants' perception and viewpoint on the effectiveness of online teaching in architectural education. The data obtained was evaluated by assessing the probability of responses to assess the overall agreement or disagreement of the effectiveness of online teaching, followed by a calculation of the score of the effectiveness of the same.

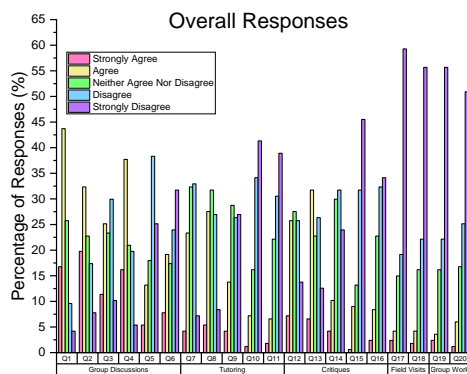


Figure 1: Overall responses

Figure 1 shows a graphical representation of the overall responses received through the questionnaire in terms of the percentage of responses received based on the total responses for each question based on the teaching method utilised. It can be seen that there is a general agreement for Questions 1,2, and 4, which asked whether participants felt like they could participate in online group discussions, whether they did not tend to pretend to participate, and whether they could easily share teaching material online, ranging from 32% to 44% of respondents stating that they agreed with the statements, and 15% to 20% stating that they

strongly agreed with them. In contrast, it can be noted that Questions 15, and 17 to 20 received strong disagreement, ranging from 45% to 59%. It can also be seen that the teaching methods of field visits and group work have strong disagreement on effectiveness of online teaching, where participants' responses indicate that physical site visits and experience of architecture is necessary for effective teaching, and that group projects including the creation of structures and teamwork and soft-skill development require physical experience.

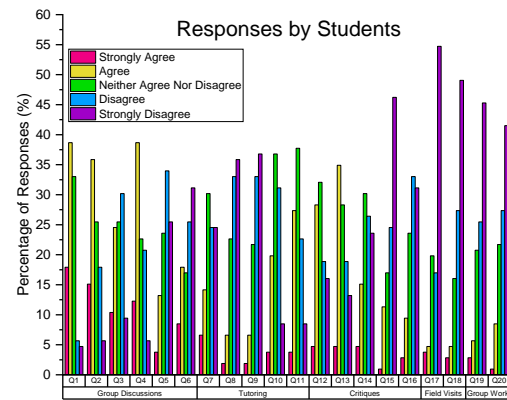


Figure 2: Students' Responses

Figure 2 details the results as analysed based on those received by students. A similar trend can be observed, where teaching methods of field visits and group work can be seen to be not effective when conducted online, however, some factors affecting effectiveness of group discussions are perceived to be effective online.

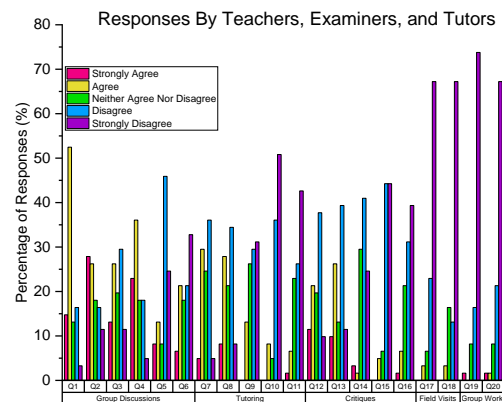


Figure 3: Responses by Teachers, Examiners, and Tutors

Figure 3 shows the responses received by teachers, examiners and tutors based on the method of teaching and question number. In comparison to Figure 2, it can be seen that less teachers, examiners, or tutors have a neutral

stance about the effectiveness of online group discussions as per Question 1, however more students (32.7%) have responded neutrally. In addition, teachers, examiners and tutors have a higher rate of positive responses (strongly agree and agree) of 67% to Question 1 in contrast to students (57%).

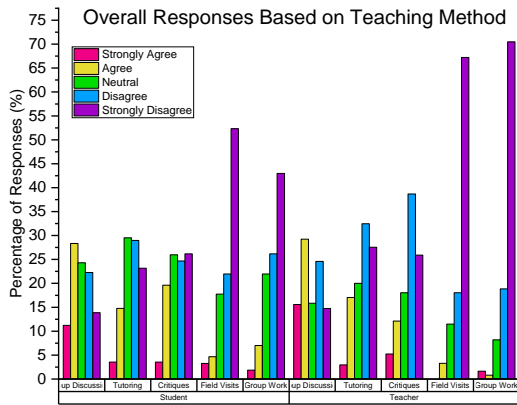


Figure 4: Overall Responses Based on Teaching Method

Figure 4 shows the overall responses obtained in relation to the type of teaching-learning method utilised online: group discussions, tutoring, critiques, field visits, or group work, for students and teachers (including teachers, examiners, and tutors) separately. It can be seen, as with the general trend of the previous graphs, that field visits and group work are generally perceived as ineffective, whilst group discussions are more effective, although only marginally, as 28.5% are generally in agreement, whilst 23.2% are in disagreement. In stark contrast, however, field visits and group work have strong disagreement rates of 57.5% and 53.3%, respectively, whilst strong agreement is at 2.1% and 1.8% for the two methods. Further, it can be noted that the rates of strong disagreement regarding the effectiveness of online field visits and group work are greater according to teachers (67.2% and 70.5%) than students (52.3% and 43%).

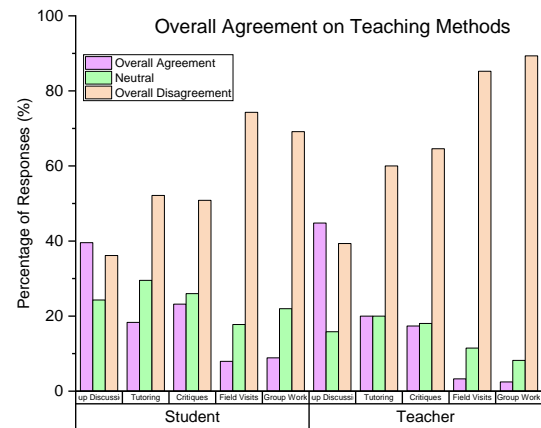


Figure 5: Overall Agreement on Teaching Methods

Figure 5 shows the overall agreement or disagreement based on each teaching method, categorised between teachers (including teachers, examiners, and tutors) and students, where all “Strongly Agree” and “Agree” responses were taken as overall agreement, and “Strongly Disagree” and “Disagree” responses were accounted for as overall disagreement; “Neither Agree Nor Disagree” was considered to be a neutral stance. In this, it can be seen that majority overall agreement is only found in online group discussions, where overall agreement was received by 41.5% of respondents. However, this should be compared with overall disagreement, which was 37.2%, where only 4.3% more respondents agreed that group discussions could be used effectively for online teaching. In contrast, overall disagreement is shown under all four other teaching categories, with disagreement ranging from 54% to 77%, compared against overall agreement ranging from as low as 6.6% to 21.2%. Further, it can be seen that overall disagreement in all teaching methods is higher for teachers than students, but overall agreement is also higher for group discussions in teachers as students have provided more general responses.

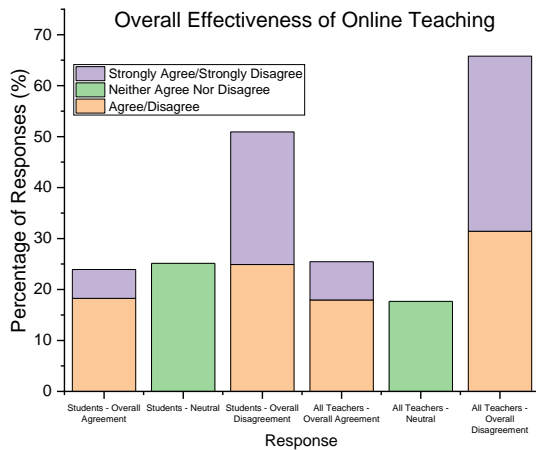


Figure 6: Overall Effectiveness of Online Teaching

Figure 6 shows the overall effectiveness of online teaching, which takes into account all responses received, where each factor is accounted for in equivalent weightage contributing to the concept of “effectiveness”. The overall agreement responses are shown for students and teachers (teachers, examiners, and tutors) separately. It can be noted that students have a more neutral viewpoint on online teaching overall, marginally higher than overall agreement, in comparison to teachers, but overall disagreement is significantly greater than both. Neutral responses are lower in teachers than students. In addition, when considering the overall results for all roles, it can be seen that 23.8% of respondents are in overall agreement of the effectiveness of online teaching, whilst 54.2% are in overall disagreement, and 22% are neutral. This shows that more than twice as many respondents perceive online teaching to be ineffective in comparison to those that are in agreement of its effectiveness.

As a final analysis, a score of effectiveness was calculated to determine the overall effectiveness of online teaching. The concept would be represented by a value between -2 and +2, where +2 would be the maximum effectiveness that could be obtained (where all responses to all questions by all respondents would have been “Strongly Agree”), and -2 would be the lowest mark that could be obtained (where all responses to all questions by all respondents would have been “Strongly Disagree”). This calculation carried out by allocating a value of +2 for responses of “Strongly Agree”, +1 for “Agree”, 0 for “Neither Agree Nor Disagree”, -1 for “Disagree”, and -2 for “Strongly Disagree”, in order

to account for the weightage difference between strongly agree/disagree and agree/disagree responses. The total value obtained was then calculated as a ratio out of the maximum mark obtainable and converted to an average value for each response. The results from the calculation are shown in Figure 7. The overall score of effectiveness of online teaching in architectural education was found to be -0.52 suggesting overall ineffectiveness with general disagreement.

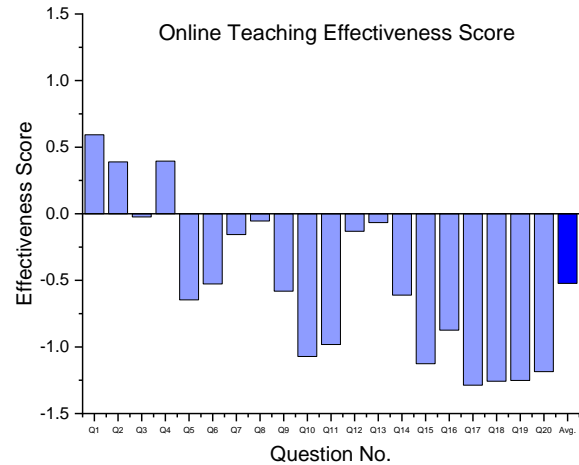


Figure 7: Online Teaching Effectiveness Score

V. CONCLUSION

This research was conducted to find out the effectiveness of online architectural design teaching in Sri Lankan context according to the perception of students and teachers. The qualitative data were collected from 175 participants comprised of teachers and students by conducting a questionnaire survey. 20 likert scale questions were included in the questionnaire in addition to the general information in the first part. Those questions were asked under the five sections namely, Group discussions, Tutoring, Critiques, Field visits and Group works which are main teaching learning methods of architectural design.

Analysis of the results can be summarized as following.

1. When considering the overall results for all roles, it can be seen that 23.8% of respondents are in overall agreement of the effectiveness of online teaching, whilst 54.2% are in overall disagreement, and 22%

are neutral. This shows that more than twice as many respondents perceive online teaching to be ineffective in comparison to those that are in agreement of its effectiveness.

2. When considering overall agreement on teaching methods, it can be seen that majority overall agreement is only found in online group discussions, where overall agreement was received by 41.5% of respondents. In contrast, overall disagreement is shown under all four other teaching methods including Tutoring and Critiques, with disagreement ranging from 54% to 77%, compared against overall agreement ranging from as low as 6.6% to 21.2%.
3. Among teaching methods used in design teaching, the field visits and group work are generally perceived as ineffective, whilst group discussions are more effective. Further, it can be noted that the rates of strong disagreement regarding the effectiveness of online field visits and group work are greater according to teachers (67.2% and 70.5%) than students (52.3% and 43%). It can be seen that overall disagreement in all teaching methods is higher for teachers than students, but overall agreement is also higher for group discussions in teachers as students have provided more general responses
4. The overall score of effectiveness of online teaching in architectural education was found to be -0.52 suggesting overall ineffectiveness with general disagreement in comparison with -2.0 (the maximum score obtainable for ineffectiveness)

Difficulty of finding participants with similar experience in both online and face-to-face architectural design teaching learning environments and different levels of knowledge in technology possessed by the participants are the limitations of this research which might have affected the overall results. This research only focused on five main teaching methods of design teaching and it can be further improved by including alternative teaching methods and other

subjects closely associated with Architectural Design and enriching the sample.

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