AN EVALUATION OF ONLINE ARCHITECTURE DESIGN STUDIOS DURING THE COVID-19 PANDEMIC

Widiyani¹, Yorangga Citra Arundati², Margaret Yudhia Aditama³, Witriani⁴
¹,²,³ Architecture Program, Institut Teknologi Bandung, Bandung, Indonesia
⁴ Faculty of Psychology, Padjadjaran University, Bandung, Indonesia

Corresponding Author: Widiyani, widi.yani@office.itb.ac.id

Manuscript submitted: 22 December 2022 Final revised manuscript accepted: 07 March 2023

Abstract

During the "lockdown" of the COVID-19 pandemic from March to August 2020, everyone was required to work and study online from home and limit social interaction. In architectural education, transferring lecture activities online is challenging. This is because most architecture school courses are studio-based, emphasizing teachers directly reviewing student work and providing feedback in the form of scribbles. Additionally, site visits are necessary throughout the design process. This paper aims to gain a deeper understanding of the significant aspects of online design studios from the perspective of first- and second-year undergraduate architecture students during the pandemic. An online survey employs Likert scales and open-ended questions to inquire 178 students about their thoughts on online design studios and their preference for online or hybrid design studios (a combination of online and limited face-to-face studios) in the following semester. Using descriptive analysis, the data indicate respondents have varying preferences for online design studios based on the length of their studies and the drawing technique used for their assignments. The evaluation identifies three significant aspects of online design studios: the design studio system, the supervision process, and the media and facilities.

Keywords: Education, Architecture Students, Online Design Studio, Architecture Design Studio, Studio Culture

EVALUASI STUDIO DESAIN ARSITEKTUR ONLINE SAAT PANDEMI COVID-19

Abstrak

Selama "lockdown" pandemi COVID-19 dari Maret hingga Agustus 2020, semua orang diharuskan bekerja dan belajar secara daring dari rumah serta membatasi interaksi sosial. Dalam pendidikan arsitektur mentransfer kegiatan perkuliahan secara online merupakan hal yang sulit. Hal ini dikarenakan mayoritas mata kuliah sekolah arsitektur berbasis studio, dengan penekanan pada dosen yang meninjau langsung hasil karya mahasiswa dan memberikan umpan balik berupa coretan. Selain itu, kunjungan ke lokasi diperlukan selama proses desain. Tujuan dari makalah ini adalah untuk mendapatkan pemahaman yang lebih dalam tentang aspek signifikan dari studio online dari perspektif mahasiswa arsitektur sarjana tahun pertama dan kedua selama pandemi. Survei online menggunakan skala Likert dan pertanyaan terbuka dilakukan untuk menanyakan pendapat,
178 mahasiswa tentang studio online dan preferensi mereka untuk studio online atau studio hybrid (gabungan studio online dan studio tatap muka terbatas) pada semester berikutnya. Menggunakan analisis deskriptif, data menunjukkan responden memiliki preferensi yang berbeda-beda untuk studio online berdasarkan lama studi mereka dan teknik menggambar yang digunakan untuk tugas mereka. Evaluasi mengidentifikasi tiga aspek signifikan dari studio online: sistem studio, proses pengawasan, dan media dan fasilitas.

Kata-kata kunci: Pendidikan, Mahasiswa Arsitektur, Studio Perancangan Online, Studio Perancangan Arsitektur, Budaya Studio

1. Introduction

The COVID-19 Pandemic has forced a stop to our operations and brought about significant changes in our lives. Nobody anticipated that this catastrophe would cause a disruption into our normal routines, including the way that university operates. Students should study from home during the COVID-19 Pandemic and have courses online. Although the online course is not something new, however, online teaching at the school of architecture creates some obstacles in the learning process. The design studio is the most important part of an education in architecture since it helps students improve their creative abilities and their understanding of space via exposure to a wide range of topics (Oh, Y.; Ishizaki, S.; Gross, M. D.; et al., 2013; Dutton, 1987; 1991). In addition, students are given the opportunity to develop their critical thinking skills by methodically presenting arguments through the designs they create in the design studio. According to Gross and Do (1998), the design studio provides students with opportunities to gradually enhance their understanding abilities through activities such as manual and digital sketching, analysis, research, design, and estimating. The design studio course requires one-third of credits per semester, and it has a different system than a general course. The course at the design studio is not a straight-through learning experience; rather, students in the design studio are often split up into numerous different groups. A teacher is assigned to each group, and that teacher monitors students in the group while they complete their duties (Ledewitz, 1985; Lueth, P.L.O, 2008). As a result, there will be a greater emphasis placed on class discussion than is usual.

Due to Pandemic COVID-19 pandemic “lockdown” all students including architecture students got to experience an online design studio. Schools of architecture need to adjust to this new structure. Nevertheless, almost none of these architectural schools have ever used an online design studio. Moreover, relatively little research has examined the face-to-face system in architectural design studios, since studio organization does not seem to be the primary concern. As a result of the COVID-19 Pandemic, we are aware that online students may be at risk, despite our agreement that a face-to-face studio is the ideal way of instruction. In this paper we aim to learn what to do if, in a challenging situation like the COVID-19 Pandemic, a design studio must be conducted. The purpose of this research is to better identify the barriers that students encounter during the online design studio process, and it may help address a knowledge gap about how to manage an online design studio. The goals of this study are two-fold. First, it will study the online design studio barriers, allowing improved strategies for the next online design studio. Secondly, it will help provide teachers with a deeper insight into a diverse online design studio for distinct drawing styles. In order to achieve these goals, this study will investigate architecture students from Institut Teknologi Bandung (ITB) who use two separate drawing styles, namely hand drawing and computer drawing.

The Design Studio Culture at Schools of Architecture

As the essential core of architecture education, the design studio culture educates students on the use of working as if in the profession. Some studies agree that the design studio teaches students
to learn by doing at the studio with or without teachers (Lueth, P. L. O., 2008; Shao, Y. J., Daley, L., & Vaughan, L., 2007). The design studio emphasizes the introduction of architecture’s new languages; development of designing skills; critical thinking; and arguments through experience in various design projects (Lueth, P. L. O., 2008; Ledewitz, 1985). Furthermore, the design studio develops also performative presentation and verbal communication between students and teachers or professionals (guest teachers) by explaining concept ideas, showing the reason behind their design decisions. Teachers will give feedback as iteration processes, which is essential to the design studio’s procedure, (Hassanpour, B. et al., 2011). According to Morkel (2011), given their ability to interact with students face-to-face and transfer architectural information, teachers in the design studio serve as essential role models for students. This finding supports earlier research studies showing that design studios foster the development of not only academic knowledge but also skills and personal growth. Face-to-face interaction is therefore crucial as a process in the design studio.

Almost none of schools of architecture have ever operated an online design studio. Some scholars, however, conducted experiments with an online design studio and investigated additional possibilities for this process (Morkel, 2011; Bender, D. M., & Vredevoogd, J. D., 2006; Broadfoot, O. and Bennett, R., 2003). In Australia, Broadfoot, O. and Bennett, R. (2003) compared a face-to-face design studio with an online design studio, which they called an internet-based studio. The results showed that, a number of factors, like emphasizing learning by doing, having one-on-one conversations and providing feedback between a teacher and a student, and adopting a cooperative working or teamworking style, generally increased the success of studio design. The outcomes for the online design studio revealed variations in the process between an online and a face-to-face design studio. The online design studio places a strong emphasis on reflection and consideration before a discussion. While the evaluation of the results is emphasized in the face-to-face design studio.

While investigating the workability of an online design studio, Bender, D. M., & Vredevoogd, J. D. (2006) modified face-to-face communication. The study transformed the feedback at the face-to-face design studio by recording the teacher's sounds and remarks while giving feedback on students' works. Results showed the recording of feedback offers potential benefits for students as they can play the recording again and again. Teachers are burdened by the recording method since they must note the same widespread errors in students' work, if any. Teachers must also be tech savvy in order to use the recording system, particularly in terms of knowing how to download drawings, record, and provide feedback to students. According to Morkel (2011), despite the fact that the recording system appeared to be flawless, it was understood that the online studio would not be able to replace the face-to-face studio.

The communication methods in an online environment would have some changes compared to face-to-face ones. It is argued that the learning tasks, the outcome, and the environment are the same (Walpole, D., 2012). A one-on-one communication style is essential in transferring the tacit knowledge of architecture, which is implicit in the design. Therefore, in an online studio, the pedagogy should be interactive and have a collaborative learning environment to show their work digitally, including sketches and models to get crits from the teachers, professionals, or students. Unfortunately, the study by Walpole, D. (2012) did not mention the details of his study's results.

**Drawing Techniques at Schools of Architecture**

Technology has opened up new options in drawing methods, ranging from manual sketches to digital drawings, including the use of touch-screen technology, which functions similarly to manual sketching (Makstutis, G., 2018; Soliman, A. M., 2017). There are benefits and drawbacks of using drawing technology. Digital drawing techniques, for example, according to Makstutis, G. (2018), provide unified workflows, which might speed up the drafting process. However, the procedure requires some software and hardware setup, as well as prior programming considerations. Whether
utilizing a pen and pencil or a digital tablet and stylus, manual sketching methods are simple and provide greater versatility and adaptability (Makstutis, G., 2018). It is argued that sketches with a digital tablet and stylus may provide somewhat varied experiences owing to strokes and ink variances (Makstutis, G., 2018).

**Studio Architecture System**

The architecture studio nowadays is not much different from the traditional model, which based on project work with iterative design solutions through supervision (Broadfoot, O., and Bennett, R., 2003; Kuhn, 2001). In the design studio, students are divided into several groups. A teacher will supervise a group of 8-9 students for the whole semester. Students have to work two full days per week in the course, including two hours of instructional sessions together in a class. Teachers supervise and give feedback for about four hours per week during studio time.

During the COVID-19 Pandemic, it was mandatory for everyone to do their jobs from the comfort of their own homes. At that point in time, students in their first and second years were in the midst of the third week of their final project. As a direct result of this, teachers altered their approaches to teaching in accordance with their own instincts throughout the first week. As soon as people became used to using the various platforms for meetings, such as Zoom meeting, Whatsapp chat groups or video calls, Google Meets, or Microsoft Teams, the online studio was able to start operating efficiently on the second week rather than the first week. The procedure for supervision was as follows: initially, students were expected to email their drawings to the teachers; next, after the teachers examined the drawings, students started having synchronous meetings with the teachers and had discussions relating to their drawings. Students were able to make corrections and continue making progress on their drawings by following these steps. Using an online design studio is considerably more challenging than using a traditional one. When students are working on drawing in a traditional design studio, teachers are able to discuss them face-to-face. In an online design studio, students must submit their designs, wait for the teacher to review them, and then engage in discussion.

Architecture students are assigned tasks of varying complexity depending on the level of design studio they enter. The more advanced level will receive a more difficult assignment. Typically, students in their first year of architecture are requested to do assignments using their hand-drawing skills. Students will acquire computational skills for their next assignments and applications at the next level. Most studio assignments assign students to do location field surveys or observations. In addition, some architectural schools require their students to make an architectural model known as a maquette. Sometimes throughout the working process, the design studio asks students to collaborate. The entire design process should be online throughout the "lockdown" of the COVID-19 pandemic. As a result, students were unable to perform field surveys or work as a team, as the majority of them had returned to their hometowns. In addition, even if students were able to design a maquette, it would be challenging for them to display it to their lecturers if they only had one camera during the online supervision process.

**2. Method**

This research study was performed by students from the first and second years of the Architecture Program at Institut Teknologi Bandung, Indonesia who work with two different drawing skills approaches on their design studio. Students in their first year are responsible for producing manual hand drawings, whereas students in their second year are responsible for producing digital drawings (with the use of a computer). The method for data gathering, analysis, and a review of data collection are detailed in the following section.
Design

This study was surveyed students after the end of the academic semester and over the period of a three-day online survey via an online questionnaire on their evaluation of the learning process during the COVID-19 Pandemic, focusing on the design studio course. Students were questioned about their preferences for working at home or in the studio, including working on design, making maquettes, having online-instructional-courses, and ensuing productivity using a Likert scale ranging from 1 to 4 with 1 indicating strong disagreement and 4 indicating strong agreement. Inquiries were also conducted regarding the students’ preferences for communicating online versus offline while under supervision. Furthermore, the questions asked preferences about comfort, challenging difficulties, stress when working from home, and whether assignment load on design studio increased during the online session. In total there were 11 questions and the description analyses was applied to describe the results. We also asked to students about their satisfaction with the studio system, the supervision process and communication on receiving feedback from teachers, their subjective feelings related to productivity and pressure feelings, difficulties in having online facilities.

In addition to the Likert scale questions, there was an open-ended question in which students were requested to describe any complaints, difficulties, or recommendations for hybrid design studios if they are implemented the following semester. The open-ended questions inquired about the students’ feelings and issues using the internet while working from home, as well as their opinion on whether or not the online studio should be offered the next semester.

Analysis

The data of first-year and second-year students are separately analyzed to identify any differences. The descriptive analysis was used to explain the response distribution on the Likert questions. A content analysis was used to analyze the open questions in order to comprehend the complaints and suggestions about design studio courses. Content analysis assisted in determining the reasons for agreement or disagreement with online or hybrid (combination of online and face-to-face design studio systems) methods, as well as the patterns of responders. As the majority of responses were in the form of sentences, their interpretation was necessary to ascertain the respondents’ intent (Stemler, S., 2000). In the first stage, each researcher independently analyzed the responses in terms of certain possibilities, meanings, or connotations; in the second step, three researchers discussed the findings. After researchers agreed on the significance of clustering, clusters were counted.

Participants

The participants were first- and second-year students enrolled in the Architecture Program at Institut Teknologi Bandung, Indonesia. There were 94 first-year students and 84 students in the second year who participated on the design studio course. To encourage students to participate to the survey, it was stated on the questionnaire that the results of the survey would not affect student rights and would only be used to improve the design studio program's offerings. The student association contributed to the process of distributing the questionnaire. A total of 136 answers were collected. Due to the simplicity of the questionnaire, it was possible to examine all of the replies obtained. The data included 52.9% of students who were in their first year and 47.1% of students who were in their second year. The data represented 74.2% of the total 1st-year students and 76.2% of the total 2nd-year students. In order to eliminate any possibility of bias in their responses, students were required to disclose their grade they received in the design studio they had completed before. Over 88% of students who answered the questionnaire received an A or AB as grades for their design studio work during the prior semester, while the remaining students received a grade of B for their work. As a result, we are able to make the assumption that the students responded to the questionnaire in an honest manner.

71
3. Results and Discussions

Results

As seen on the Table 1 results on the 4-point Likert scale showed that second-year students who agreed with the statement "I prefer to work at home" were higher than first-year students. However, the tendency to work at home is slightly preferred by all respondents who need to make maquette-models. Over 53% of respondents expressed their disagreement with having the studio instruction session. Students like having instructional sessions at the university better than at home. Interestingly, there are differences in productivity of working; first-year students felt less productive when working at home, while second-year students felt vice versa. All respondents mentioned that they disagreed with the statement: "Students have clear feedback online compared to the face-to-face studio.” In general, all respondents disagreed with the statement: “Students have regular supervision online more than face-to-face system”. In particular, more students from the second-year showed their disagreement rather than students from the first year. Like the previous question, all respondents presented their disagreement with the statement: “Communication is more accessible during work at home than at the university”, second-year students scored higher in disagreement than first-year students.

The statement regarding whether students are fine either to work at home or in the studio, showed both students' agreement. For students, it does not matter whether they work at home or in a studio. However, when they have to work continuously at home, over 50% of first-year students and about 50% of second-year students will feel stressed. Concerning the difficulties with the unstable internet, first-year students expressed higher agreement that they faced internet issues than second-year students. Furthermore, first-year students showed their agreement with plenty of assignments that increased during the studio online. In terms of the increasing load of assignments, the second-year students were in disagreement with it.

A content analysis was performed on open-ended questions, as was described in the methods section earlier. The open-ended questions elicited 117 responses in all, and the analysis of those responses revealed four distinct categories or patterns. These were as follows: (1) the design studio system; (2) the supervising process; (3) media and facilities; and (4) subjective issues (as seen on Figure 1).
A. The Design Studio System

When we asked about the learning process in the pandemic situation, the evaluation showed that first-year students and second-year students mostly agreed to have an online studio for health reasons and were worried about sharing the virus with others. In particular, students who live outside the city had some concerns about traveling and its expenses; thus, they tended to agree to have a limit on face-to-face studio time.

Regarding the new online system during this pandemic, results showed that both students had some dilemmas regarding limiting access to the studio at the university. On one hand, they were afraid that working at home might generate a tedious and lousy mood. On the other hand, they also worried about having face-to-face at the studio as there was no uncertainty of the hygiene environment. Both students felt that an online studio generated difficulties for them compared to a face-to-face studio because they could not discuss design problems nor socialize with their peers. Furthermore, second-year students who used digital drawing discovered that working from home has drawbacks, particularly for inexperienced computer users. Since it is a face-to-face studio, they can see and learn from others how to use the program.
B. The Supervision Process

All respondents were able to compare two learning processes in the design studio they experienced, namely the face-to-face design studio before the COVID-19 Pandemic and the online design studio during the Pandemic COVID-19. Regarding the results, it seems that communication between teachers and students is essential to proceed with the design studio. Students pointed out the most about the supervision process. Results showed that the face-to-face design studio offered more effective communication with minor misinterpretation and avoided misunderstanding than an online design studio. Referring to having an online design studio, students agreed that having a video conference gave better ways of communicating than comments on the email during the supervision time. At the beginning of the COVID-19 Pandemic, only a limited number of online meeting platforms were available. Thus, students got one-on-one supervision. Nevertheless, students preferred to have supervision in a group rather than a private one. By doing so, they could see other students' progress. Seeing other students' progress in a group seems necessary as students can compare their progress to others.

Moreover, seeing others' work in a group could reduce stress and the burden of being left behind by others. There are indications in this study that self-studying or working at home alone and getting personal feedback generates stress and the feeling of being left behind by others in the group. The result somehow corresponds to a study about peer group judging of architecture students in Indonesia (Megayanti, T., Aryanti, T., and Dewi, N. I. K., 2019). In their paper, it showed that working together at the studio and having a discussion with their peers or having supervision in a group had proved to have positive impacts, especially on increasing discipline and motivation. A study on how design tutors and students conceptualize creativity demonstrated that peers could develop students' creative skills (Rodgers, P. A., and Jones, P., 2017). Furthermore, if they are supervised in a group, students can measure their own work. The working together approach has been effective, especially for students who were slow in their efforts. Students agreed to a limited amount of face-to-face supervision in order to have access to the conversation in order to resolve concerns that arose during the online supervision procedure. Making notes on the students' drawings displayed on the screen and recording the entire process of the online supervision are now possible, thanks to the availability of more online meeting platforms. Students may receive immediate feedback that can be repeated later in this manner. The platform's main disadvantage is its high cost. Nothing has changed regarding the supervision schedule for the online design studio, like the face-to-face design studio. However, students pointed out that the online design studio is better for having a tight schedule with more detailed outcomes than the face-to-face design studio.

C. Media and Facilities

It should come as no surprise that an online design studio requires access to the internet. The platform is needed for things like submitting assignments and keeping track of them. Because the vast majority of students only hand in their work within a few minutes of the deadline, the organizer of the studio needs to take into account the capacity of the server in order to minimize any delays. Due to the restricted internet coverage in Indonesia, some students who were concerned about the unreliable online connection suggested changing the submission to the night time, when internet access is more reliable. Students have reported that handing in their homework assignments online helps them save money because they do not need to pay to have them printed off because none of the assignments require paper. Every single respondent had a problem with the maquette model, and they thought that a preferable option would be to replace the figure with a 3D digital model that included at least one perspective. Because not all of the students lived in big cities, it was difficult to procure the...
materials needed to make the maquette, which resulted in the maquette creation process being fairly expensive. In addition, additional work had to be put in since the students were asked to take photographs of the maquette in order to demonstrate its completion while it was being supervised. As a direct consequence of this, the maquette model was judged to be ineffective.

D. Subjective Issues

The COVID-19 Pandemic has forced some students to stay with their parents on days when they would ordinarily be elsewhere. In addition, the environment caused a few subjective challenges that impacted students during the online design studio. Some students said that living with their parents was distracting since there were trade-offs between working and supporting their parents with home responsibilities. It appears that helping parents is a common practice in many households. Unfortunately, no other information about the family's history is available. Regarding subjective concerns, first-year students suffered more with their home assignments than second-year students. It is pertinent since first-year architecture students have less experience than second-year students. Therefore, it makes sense if the results reveal that first-year students had more discomfort than second-year students. There are some students who are dissatisfied with the capabilities of their personal computers, despite the fact that, in a common situation, those students who do not have a computer that meets the minimum requirements for rendering are permitted to use the university’s computers located in the laboratory. Those students had a difficult time keeping up with deadlines due to the limited capabilities of the computers.

Discussions

Both assignments required students to create maquette models to explore forms other than the design drawings. However, there are two challenges to creating the model, namely that not all students have easy access to find materials for the maquette model, and showing the models takes time because students must first take numerous images from various perspectives. So, during the process the first-year students replaced the maquette model with perspective hand drawings, and the second-year students with perspective computer drawings with rendering. As a direct consequence of this, students of varying grade levels may experience a variety of challenges. Furthermore, this study investigates the online design studios of first- and second-year students to establish if varied drawing techniques demand distinct approaches.

Students highlighted three essential aspects of the online design studio: the studio system, the supervision process, and the media and facilities. Students were dissatisfied with the online studio procedure, which included requiring students to remain independent with their studies and limiting teamwork and peer interaction. In addition, as this study analysed online design studios during the COVID-19 Pandemic, the results revealed that students had personal worries around stress, distractions from their homework, and the computers’ capability. The subjective issue contributed to the dissatisfaction of students with working from home. Similar findings were discovered in a survey of interior design students in the United States, who rated face-to-face studios as more effective and satisfying than online studios (Cho, J. Y. and Cho, M. H., 2014).

This research compared an online design studio to a face-to-face design studio and found that they were mostly incomparable, particularly for first-year students with no prior experience in design studio courses. Therefore, in the future, utilizing an online design studio will necessitate a new strategy, such as creating weekly or daily objectives. Students will be more self-disciplined and less vulnerable to psychological pressures and influences as they complete their assignments. In response to the issue of peer groups, it is suggested that students prefer peer evaluation over personal supervision. To ensure that students do not feel alone and can interact with others, they may be
forced to utilize an open online meeting during studio time to study in a group. However, holding a multi-hour online meeting is costly.

This research noted that students faced numerous demands to finish the online design studio in a timely basis. Nevertheless, the online design studio is still open to exploration, which is especially beneficial when there is no feeling of pressure. The paperless submission was regarded as the single benefit of an online design studio by this research as a whole. This paperless submission was identified as a cost-effective feature.

4. Conclusion

In architectural schools, the online design studio is unusual. As a result, there is a paucity of research examining the operationalization of an online design studio. This study examined the online design studio that emerged in response to the COVID-19 pandemic. It should be recalled that the occurrence was so unexpected that the online design studios were unprepared. This study’s objective is to analyse all-encompassing, future-relevant aspects of an online design studio. Three aspects, including design studio system, supervision process, and media and facilities, were observed based on the results and discussion presented above. The online design studios are convenient from a media and facilities standpoint since students may submit paperless assignments. However, the online design studio has certain drawbacks, since it places some students in a vulnerable position, offers less motivation, and fosters fewer team-building soft skills. The limitation of this study is that it did not investigate the teachers who make significant contributions to the online design studio. Observation from the viewpoint of the teachers may lead to a more well-rounded outcome.

5. References


