

## **VIRTUAL TRANSFORMATION OF DESIGN STUDIO DURING COVID-19: INSIGHTS FROM ARCHITECTURE SCHOOLS OF BANGLADESH**

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### **ABSTRACT**

Like all other sectors, Architecture education, being largely dependent on the design studio based interactive teaching learning system, faced major challenges during the COVID-19 pandemic. To adapt with the situation, shifting to the virtual platforms was the only way of continuing academic activities. However, this transformation in the architecture education system may potentially help to adapt with the upcoming surge through the 4th industrial revolution. This study intends to critically look into how the design studio courses adapted with the covid-19 situation through virtual transformation in the context of Bangladesh and find out the advantages and shortcomings of this transformed pedagogical approach. Primary data was collected through questionnaire surveys and semi structured interviews of students and teachers of different architecture schools of Bangladesh. Thematic analysis methods were used to draw the findings from the survey data using SPSS as a tool. The study found that besides some commonly used virtual platforms like zoom, google classroom, and personalized learning management systems, specialized cloud-based platforms like Miro, Concept board etc. were very helpful for design communication and review. The study found some common advantages of the virtual transformation like software skill development, connectivity with external faculties, flexibility of place and time etc. Besides, some shortcomings were also found like gap in hands on design communication, lack in studio engagement, difficulties in perception of 3-dimensional perception of space and form etc.

**Keywords:** Virtual Transformation, COVID-19, Design Studio Pedagogy.

### **1. INTRODUCTION**

The Covid19 outbreak around the world in 2020 has transformed all aspects of daily life and caused major shift in the education sector globally, irrespective of any national or continental boundaries. Universities, being the topmost educational institutions, had to respond to this threat instantly with a visionary approach. The University of Washington was the first higher education institution in the world to postpone all in person classes from 6 March 2020 (Thomson A 2020). World Health Organization declared the Covid-19 situation as a global pandemic on 11 March 2020. On March (Adhanom Ghebreyesus, T., 2020). On 8 March 2020, the first Covid-19 patient was identified and the Government of Bangladesh initiated strict lockdown from 25 March 2020. From that day, all universities in Bangladesh had to cancel their all on campus classes and vacant the residential halls. As a result, students all around the country had to return to their home. Among them, a good proportion of students were from remote areas of Bangladesh. During this lockdown situation, universities had no choice but to transform their teaching learning systems adopting the technological advancements by using the virtual platforms. Like all other higher education programs, architecture education also struggled to mitigate this crisis. But the major challenge was to conduct the design studio courses during this pandemic as, the pedagogical approach is highly contrasting with the conventional lecture-based teaching learning system. According to Crowther (2013) and Shulman (2005), the design studio courses demand signature pedagogical approaches in architecture, art and design education. Moreover, the design studio-based courses carry almost half of the total course loads in most of the architecture curriculums in the world including Bangladesh. Conventionally, the design studio based courses require intensive engagement with the physical studio where most of the learnings happen by informal peer review. Moreover, the physical model making, drawing and continuous student-teacher engagement is also play vital role. In this situation, creating an effective virtual learning environment by ensuring those above-mentioned facilities was quite challenging. Almost half of the architecture schools in Bangladesh Among the 54 started their education in virtual platforms by may 2020 (Context BD Article, 2020). As there was no other option, students also started adopting the new normal. Besides, the architectural practicing firms in the country also started adopting by facilitating their employees for home office. However, many students all over the world experienced severe difficulties to adopt with the virtual transformation (Laura A. Gelles, Susan M. Lord, Gordon D. Hoople, Diana A. Chen and Joel Alejandro Mejia; 2020). Significant number of students didn't have adequate access to technological or human infrastructure to scale these resources to an online environment (O'Keefe, L.; Rafferty, J.; Gunder, A.; Vignare, K., 2020). In spite of these universal issues there were some positive feedbacks also regarding these virtual transformations.

In the context of Bangladesh, this study tries to investigate the experience through which students and faculty members responded to the transformation towards the virtual design studio environments within taking 4 architecture schools of Bangladesh as case among 54 schools in total. It identifies the shortcomings and key benefits of virtual transformation of the design studio faced by the teachers and the students in the context of Bangladesh.

## **2. DESIGN STUDIO PEDAGOGY AND ITS TRANSFORMATIONS**

Architecture is a profession driven subject and designing is the most significant responsibility of an architect. Therefore, to be a competent architect, training to design is one of the core objectives of architecture education. Design studio is the environment where the students learn various ways of design and nourish their creativity through experience and learning by doing. According to Ledewitz (1985), in the design studio, students learn different aspects of design education: A new language, new skills like visualization and representation and architectural thinking. According to Ceylan (2020), the design studio is the main element of architectural education nowadays. This has been established through continuous transformation of the practice and education throughout centuries (Ceylan, S., Şahin, P., Seçmen, S., Somer, M. E., & Süher, K. H., 2020). This indicates that the transformation in the pedagogy and practice is a continuous process adapting with emerging technologies and social, cultural, economic, environmental, political and industrial movements.

The history of the design studio embarked on 18th century, when Ecole des Beaux Arts was formed in France at the age of first industrial movement (Ceylan, S., Şahin, P., Seçmen, S., Somer, M. E., & Süher, K. H., 2020). The formal institutionalization continued with Bauhaus in the first quarter of the 20th century derived by modern movements, bringing architecture together with other branches of art and design (Pasin, 2017). Most of the contemporary architecture schools are highly influenced by these two core schools till today. However, this phenomenon has also faced harsh criticisms, specially from the pedagogical and practical experience of global south.

Parvin, A., & Moore, S. A. (2020) showcased that, pedagogical approaches derived by modernism, that intends to reject all contextuality and historic references according to its core manifesto, has played major role to inherently colonize the global south. They also critically identified that the 18th century architectural pedagogy conflicts with local needs and issues, by creating generations of architects, mostly trained to serve another context, either directly or indirectly. Mostafa, A., & Parvin, A. (2012) urged the inevitable need of transforming the architecture education pedagogy towards responsive design pedagogy which is more context specific, problem driven and interdisciplinary innovation and collaboration focused. These criticalities indicate that architecture pedagogy will go through more transformations in the near future and the COVID-19 situation, being a global phenomenon, will undoubtedly influence this, and already we are going through it.

Though there have always been pedagogical transformations in architecture education, there has never been doubt about the significance of the design studio. Design studio is a social learning environment, where instructors and students interact in physical space within the scope of the studio. Thus, the students are able to learn from the instructor, as well as from each other (Ceylan, S., Şahin, P., Seçmen, S., Somer, M. E., & Süher, K. H., 2020). Architectural education is not restricted to only physical building design; it also incorporates value system, philosophy, sustainability, technologies and other related areas (Ibrahim and Utaberta, 2012). Design education requires a structure that directs the student designer toward multi-dimensional and dynamic thought processes (Önal and Turgut, 2017). Contemporary schools of architecture mostly follow the foundations formed by the two institutions, but the nature of education keeps evolving affected by emerging theories and methods of teaching, as well as the needs and requirements of the society. In the late 20th and early 21st century, there have been many proposals to improve and develop the quality of architectural design studio education. Educational concepts such as Chickering's theory of student development, Bandura's social learning theory, the constructivist learning environment, problem- based learning and learner-centered learning environment are some of the attempts that were implemented into the design studio to improve the quality of architectural education.

In the circumstances of the 21st century, the ecosystem of the design studio keeps evolving, creating alternatives to the existing conditions. Student-focused teaching methods are given bigger priority, and conventional methods of communication and representation are being replaced with technological instruments. Concepts like blended learning, virtual studios, or online studios are being used more frequently under the light of information and computer technologies. Using advanced methods of communication, instructors and students can meet each other regardless of the physical distance. Thus, collaboration between institutions from different countries become possible. Consequently, the implementation of advanced communication and visual representation technologies into the design studio becomes an obligation and the necessity and qualities of the physical environment are starting to be questioned. In addition to all the other developments, the COVID-19 pandemic in 2020 has been challenging, but at the same time favorable period regarding the transition from physical studios to online learning environments in design education and design studios have been the places that were affected by the changing circumstances of communication and social relations. Recent

approaches in the development of the design studio processes have been extremely supportive creating alternative studio environments during the pandemic period.

### 3. VIRTUAL TRANSFORMATION OF ARCHITECTURE DESIGN STUDIO:

Architecture education has been experiencing continuous transformations since it's formalized inception by the beaux arts school during the first industrial revolution (Pasin, 2017). Then the modern movements derived the first major transformation. The idea of virtual transformation of architecture design studio is not a new conception. Virtual design studio has been a part of architecture education since about two decades (Strojan & Mullins 2002; Kvan 2001; Wojtowicz 1995). The mass access to computers equipped the architects to adopt with new technologies during the 90's and the mass spread of internet from the beginning of 21st century paved the way of creating a virtual world. Kvan (2001) explored the possibilities, prospects and opportunities of virtual design studio pedagogy, though the tools and technologies were not available and accessible at that time. However, in the past two decades through massive technological advancements those technologies have become cheaper, more accessible, and an inseparable part of everyday life (Iranmanesh, A., & Onur, Z.,2021). This transformation was led by 2nd and third industrial revolutions. Today, virtual design studio concept is not only a concept, rather a rational practice and seeming to be massively enforced by the COVID-19 pandemic.

Furthermore, the students of today are those who have been born and raised with digital communication media, they are the native speakers of the language of social media and digital space. Hence, their initial engagement with VDS might prove to be more fruitful as they have the capacity to use it to its full potential (Iranmanesh, A., & Onur, Z.,2021). This new generation of students may well have different interpretations of virtual place and thus be able to communicate more easily in a virtual setting (Pekta's 2015).

### 4. MATERIALS AND METHODS

The study was conducted through a survey that collected responses from both ends, the teachers and the students. The educators involved in teaching undergraduate programs in different architecture schools of Bangladesh participated through a structured online survey. The methodology was adopted by contextualizing the methods of Ceylan, S., Şahin, P., Seçmen, S., Somer, M. E., & Süher, K. H. (2020) Anurag Varma & Ar. Mohd. Shoeb Jafri (2020) which were from the context of India. Because of the pandemic lock-down, the questionnaire survey was conducted online through Google Forms which is a free online survey tool. The user-friendly interface enabled the majority of the students and teachers to contribute to the questionnaire. The survey includes 2 questions with short nominal answers and 18 questions to choose from a 5 point Likert scale. First set of three questions focuses on the common feedbacks on online studio process, while the second set of five questions is about utilizing alternative learning opportunities in online studio. Third set of four questions focuses on utilizing digital drawing and model making tools, and fourth set of five questions investigates online studio as a digital platform for socialization and production. An additional set of two questions asks participants to give nominal information about their studio course and the place they resided during online education. The survey received 147 responses from the students and 31 from the teachers. 52 of them being from 1st year students, 56 from 2nd year, 59 3rd year and 45 4th year students. Responses were analyzed using SPSS, a statistical analysis software package. Survey results are given below.

### 5. RESULTS

The results gained from the survey are assessed generally and in relevance with the question sets. Additionally, all the questions and question sets were assessed in relationship with the studio level of the students. Cronbach's alpha analysis based on question sets shows that the results of the questionnaire are reliable. The analysis results are shown in Table 1.

Table 1. Cronbach's alpha analysis results based on question sets

Question Sets	Average	Standard Deviations	Cronbach alpha
1. Set-1	3.5	.87	.777
2. Set-2	3.7	.73	.742
3. Set-3	3.25	.95	.782
4. Set-4	3.51	.74	.713

The questions asked covers the areas follows:

1. I think online studio experience is beneficial for my future career as an architect
2. I benefitted from joining online discussions with our instructor to exchange ideas and contribute to my friends' design process

3. It was useful to watch the recorded sessions of online critiques and juries
4. During the online studio process, I benefitted from alternative research methods and digital resources (e-library, web resource, social media, etc.)
5. During the online studio process, I learned to use alternative communication (Zoom, its learning, Skype, etc.) methods
6. During the online studio process, I had the opportunity to improve my CAD (Sketch Up, AutoCAD, Revit, etc.) skills
7. During the online studio process, I had the opportunity to improve my hand sketching skills During the online studio process, I had the opportunity to improve my physical model making skills
8. During the online studio process, to represent my design, I utilized physical model more than digital model as a tool. Since I did not need hard copies of my work, I contributed to efficient use of resources
9. Online exhibition of my design proposals both in online studios and online platforms such as Pinterest will publicize my work and motive me as a prospective architect
10. Virtual site visits (Google Earth, Google Maps, etc.) had a positive impact on my design process
11. Online studio provided alternative opportunities to communicate with my friends
12. Physical studio discussions on our design proposals with my friends is replaced with online platforms
13. The online studio turned the time I spent at home into a productive activity
14. Online studio allowed me to become more self-disciplined and more organized in my home environment
15. Online studio strengthened my sense of belonging to my instructors and friends Online studio lessons allowed me to realize my ability to adapt to and be productive under sudden changing conditions

## **6. DISCUSSION**

The survey points out important outcomes regarding students' opinions on design studio courses on online platforms. First, students think the most prominent benefit of online studios appears in the use of digital communication tools such as Skype, Zoom, Hangouts, etc. This is a predictable result because although the students already use social media instruments very effectively, they are not familiar with these formal digital communication tools, and they find it beneficial to get introduced to those types of instruments for distant communication. They are aware of the fact that these platforms will most possibly be important media for communication in their professional life. Another important outcome indicates a weak side of the conventional physical studio environment. Students think that it is beneficial for them to be able to watch the recordings of the discussions in the online sessions repeatedly. In the conventional studio environment, students have to join the discussions between their instructors and peers, and at the same time they are dealing with their own design work. This situation causes them either to miss some valuable information or comments, or to interrupt their concentration while they are working.

The opportunity brought by the online studio, the recording of the sessions, allows the students to concentrate on either their work or the discussion and do the other at another time without missing any information or comment. This is an important feature of online education that needs to be implemented into the design studio even if the studio transforms back to the conventional physical environment.

The study has an important outcome regarding the psychological effects of the design studio, especially at stressful times like the pandemic. For design students, the productive activity of dealing with a design problem can turn into a therapy to deal with the difficulties of the real world. If they are equipped with necessary tools and they are given the chance for self-actualization, students can make productive places even from their very own living environment. Approaching the survey from a perspective of different studio levels, one can become aware of significant outcomes, as well. Relatively more positive mean values of first year students may derive from their eagerness for design education, as the fourth year students are under most pressure for they are going to graduate soon after the unexpected situation. There is a small difference between second year and third year students, as the total mean values of third years are slightly higher than the second year students. This may cause from the inner dynamics of the studio environment and individual or collective experiences of the students.

At the third set of questions where the changes in the digital drawing, hand-sketching and model making habits of the students are questioned, there are some significant outcomes. First and second year students' opinions are definitely more positive than the third and fourth year students. The source of these opinions may derive from the former experience of the students. First and second year students are still in the training phase in terms of visual and graphic representation methods, as the third and fourth year students think that they are in a more advanced level in that regard. Even though this comment is open for discussion, the future design of the design studio can benefit from the evaluation

of the students to focus more on teaching basics of visual representation for junior students and on advanced and alternative graphic communication methods for seniors.

Socialization is an important aspect of the design studio environment. This fact is obviously reflected on the survey results. Even on online platforms, students think the design studio is a good opportunity for socialization. The online experience may help students to discover different ways of socialization. As a matter of course, social relationships rely mostly on unstructured and momentary activities. Physical studio environment provides those kinds of opportunities easily, as the online environment is a bit weak in that aspect. That might be an area of development for the online design studios, or a significant point in the design of hybrid studio environment.

## 7. CONCLUSION

The methods and strategies for learning in the design studio have been evolving since the beginning of its existence. This study about students' perception of online studios during the COVID-19 pandemic shows that online studios are yet another stage of the evolution to develop the quality of the studio for the education of well-equipped designers. With the pandemic in 2020 it is proven once again that conventional methods of design education can easily get obsolete and it can become impossible to reach the students through physical relations and contact. Alternative methods of communication that enable distant education need to be provided, and advanced visualization and representation methods need to be developed in order to match with online communication instruments. On the other hand, personal relations in the design studio education shall not be ignored. In the studio environment, there is still room for physical contact and conventional communication methods that allows students to get more involved with their design problem under the influence of their instructor. Even though during the pandemic period all the communication methods and representation of design proposals transformed into digital and virtual methods, it was an exception for the workflow of the design studio courses. After the pandemic is over, the conventional and emerging education technologies need to be merged in order to reach more advanced methods for the design studio education. The experiences gained during the pandemic times can be used for the development of the design studio education in the future.

Blended learning, distant education or virtual studio methods were already in the agenda of architectural design education in the last decades. There are many researches dedicated to these alternative studio organizations (Morozumi et al., 2001; Niculae, 2011; Schnabel and Ham, 2012; Masdeu and Fuses, 2017; Iannou, 2018). Hybrid methods for design education are potentially the most appropriate ways of teaching and learning in the design studio. The pandemic in 2020 accelerated the speed of recognition of these approaches and forced educators to take it serious when they are designing their own design studio structures. In the future, studies on various approaches for the design studio education and transdisciplinary work on the workflow of the design courses need to be increased in quality and quantity.

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