

The Ones Who Have Never Been Physically in a Studio: Myths and Hacks of First Year Basic Design Students in the Pandemic

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Abstract

Design and architecture students who have started university in 2020, unlike the students before, attended virtual studios without experiencing the physical studio environment. The vast majority of them attended classes from their rooms or living rooms of their homes in different cities and tried to meet the requirements of the courses. Their computer screen turns into their eyes and its speakers turn into their ears. They had no other experience to compare this with, yet they have lived a studio environment, juries and more, even though they are virtual. This research focuses on their experiences with an emergency remote teaching basic design studio and their expectations of a design studio environment. By making short, semi-structured interviews with first year architecture students (n=14), this study explores how pandemic experience of 2020 might affect the basic design studio environments of the future. As a result of the study, two themes emerged based on the analysis of the data. The first, called the myths of the studio, reveals the expectations of the students about the design studios and how they try to realize these expectations virtually. The second theme, defined as hacking the studio, emphasizes how these students perform some actions that they cannot do in a physical studio environment by using the technologies they have.

Keywords

design studio, virtual design studio, basic design studio, emergency remote teaching, COVID-19 pandemic

Introduction

Along with many other changes affecting many fields all around the world, the global COVID-19 pandemic forced most universities to move their design studios into a virtual space. Started in 2020, in the middle of the 2019-2020 Spring semester, the students who began to attend the virtual studio had already experienced a physical studio before. With the continuation of the pandemic, at the beginning of the 2020-2021 Fall semester, new students enrolled in universities, and they become the first students who experienced a virtual studio before experiencing a physical one. The first-year design/architecture students of the 2020-2021 academic year have nothing but expectations on the studio education.

The vast majority of these students attended classes from their rooms or living rooms of their homes in different cities and tried to meet the requirements. Most of them never met their classmates or lecturers face-to-face, had never been on the university campus, or never been in the city which their university is in. Their computer screen turned into their eyes

and its speakers turned into their ears. Their internet speed became an important issue, while they were trying to communicate with their lecturers and peers. They had no other experience to compare this with, yet they have lived a studio environment, juries and more, even though they are virtual.

This paper presents a basic design studio from the 2020-2021 Fall Semester as a case study aiming to reflect the student's point of view, to determine their online basic design studio experiences in pandemic and to give design educators an idea about what can be done in the future in such emergency situations.

Background of the Study

Design studio has been seen as not only a “physical space”, but also a “unique pedagogic method” in design education (Broadfoot and Bennet, 2003). Since it is seen as the “backbone” of architecture and design education, studio has always had a primary position in design teaching, mostly being a *taboo, undebatable* and *untouchable* (Salama and Wilkinson, 2007, p. 3). Schön (1985, p.31) formulates the design studio as a process of “reflection-in-action”, emphasizing that studio learning is based on “practice and critical reflection on practice”. Thus, “learning-by-doing”, Schön states, is the main pedagogy of studio education. In studio, moreover, students and their tutors are in a continuous dialog, which Schön calls as “reciprocal reflection-in-action”, in which tutors convey their tacit knowledge to students by drawing and talking: the actions consisting of together the “language of design” (Schön, 1985, p. 31). Also, students not only learn from their tutors, in studio setting, but also from their peers by observing each other’s work (Kvan, 2001). In this way, studio is an “active site where students engage intellectually and socially”, being a “social practice” rather than mere knowledge-based education (Dutton, 1987, p. 16). With this socio-spatial character of the studio, students gain the ability of communication, criticizing and collaboration with others about their works (Gross and Do, 1997), which are very crucial parts of peer learning (Kvan, 2001).

Considering these essential socio-spatial features of the studio rooted at the centre of design education, moving this traditional model to the virtual platform can be found confusing at first sight for ones who are unaccustomed to this idea. However, virtual design studios (VDSs) have been the active part of design education and discussed in various perspectives for more than two decades (Wojtowicz, 1995; Maher et al., 2000; Kvan, 2001). From this perspective, new studio approaches adopting digital modes of learning and integrating them with conventional ways has created significant learning and teaching models (Pektaş, 2015; Rodriguez et al., 2018; Jones et al., 2020).

While in the early years the issues regarding VDS were about the technological capabilities of those times (Kvan, 2001), today these concerns moved to how emerging tools and mediums can be effectively utilized for better learning experiences (Iranmanesh and Onur, 2021). In this respect, Broadfoot and Bennet (2003, p.4) emphasize:

“Just as the traditional design studio is arguably unique as a form of educational delivery compared to many other disciplines, the online studio also needs to be structured differently to other courses offered online by institutions around the world.”

The most vital point for this differentiation, according to Broadfoot and Bennet (2003, p.4), is to create a “community rather than isolated, one-on-one communication” in VDS. Providing continuous, effective, and collaborative communication not only between students and tutors, but also between students themselves, therefore, has a crucial role in VDS pedagogy (Kvan, 2001; Broadfoot and Bennet, 2003). Since in virtual medium students may feel like losing their identities, sense of belonging and being a part of a community due to physical distance (Saghafi et al., 2012), creating “sense of place” can be helpful for the development of a community atmosphere and the establishment of students' identities in that community (Maher and Simoff, 1999). Also, helping students to visualize their online presence such as using avatars and encouraging them to acknowledge the presence of each other may improve their sense of place, and in this way their sense of identity, creating a collaborative learning environment (Clark and Maher, 2005).

While lack of physical interaction in VDS and its likely impacts on students mentioned above may bring some questions regarding peer learning, social engagement, and motivation (Saghafi et al., 2012), Pektaş (2015, p.263) states that it provides many opportunities for students to interact not only socially but also culturally with their peers, expanding the spatio-temporal limits of physical studio. Pektaş (2015, p.263) indicates that adopting various digital tools having various affordances in VDS has a significant potential to enhance the dialogic, social, and participatory nature of studio education, supporting effective learning processes. Furthermore, enriching studio education by new technologies, especially use of social network sites, creates an appropriate environment for “collective intelligence”, rather than an approach based on individual development (Ham and Schnabel, 2011, p. 115). With this collective, collaborative, and cultural learning structure provided by VDS, students may have a great chance to improve their perspectives and to reach a more diverse body of knowledge (Sagun et al., 2001). Additionally, since it changes the dynamics of relationships between tutor and student (Kvan, 2001), VDS provides an environment in which students more actively participate (Sagun et al., 2001).

In this respect, a powerful social mode of learning is very possible (Schnabel and Ham 2012; Sidawi 2012; Jones et al., 2020); however, creating a successful learning environment for students requires a highly careful consideration of the ways in which studio experience is designed (Jones et al., 2020). Creating a learning atmosphere encouraging students for viewing each other's works, learning from others' experiences by using social comparison, and in this way developing their social presence in virtual medium contributes to active engagement of students in the further stages of the process, leading to the emergence of “communities of practice” (Jones et al., 2020).

Besides, emergency remote teaching (ERT), which is also a helpful term in defining the case study presented in this paper, can be considered as another significant perspective of this study along with the others mentioned so far. Hodges et al. (2020) defined ERT as a temporary shift of education to an alternate mode due to crisis circumstances and stated that ERT involves the use of fully remote teaching solutions for education that would otherwise be delivered face-to-face, blended or hybrid and once the crisis or emergency has abated that will return to that format. In these emergency circumstances rather than trying to create a robust educational ecosystem, the main objective was stated as to provide temporary access to instruction and

instructional supports in a manner that is quick to set up and is reliably available (Hodges et al., 2020). Furthermore, Yazicioglu Halu and Kula Say (2021) listed the needs that must be met in case of emergency use of distance education in architectural education and have emphasized that the most important elements are; students to feel the studio environment in digital environment and to share jointly, as well as quickly converting their productions into digital data and documenting them.

Within this theoretical frame, the present study aims to bring a different perspective to the virtual design studio education. As explained throughout this background section, there are many successful studies examining the experience of students not only in VDS but also in ERT. While only a few studies (Jones et al., 2020; Iranmanesh and Onur 2021) consider the VDS experience of first year students, they are mostly based on the “tutor’s point of view”. For this reason, as far as we can observe, the students’ point of view to the concept of studio either online or physical, particularly of ones who have never been in the “real” physical studio before, has not been studied much yet. In this respect, this paper will demonstrate the findings of this study from the “first encounter” of the first-year architecture students with the studio concept.

Case Study

The Basic Design Studio Course which is the case of this paper was conducted at a recently founded architecture faculty in one of the major universities in Turkey in the fall semester of 2020-2021. Course duration was 4 hours a week over a total of 14 weeks. 67 architecture freshmen enrolled in the class, and the course was held so that all these students were in one online class at a time. A lecturer from the Industrial Design Department and 3 teaching assistants from the Architecture Department gave the course via Zoom platform.

All of the lectures (4 hours for 14 weeks) were recorded, and students had access to these recordings during the semester. The attendance of the students to the course was not documented in any attendance list. Students were free to open or close their cameras during the course.

Students completed 4 design projects and a final portfolio submission during the semester. All these projects have a submission each week, generally on the day of the course or sometimes the day after. None of these were team projects, because the instructors supposed that it would be very difficult for them to work as teams, as they thought that these students had never met before and would not meet face-to-face during the lesson.

All weekly or project submissions were done via Google Classroom with the photos or videos of the exercises or with the visual presentations of projects. At the end of each project, there was a jury session, where the lecturer and all the teaching assistants were the members of the jury. Due to time concerns, other jury members could not be invited to semester juries, but a jury member from the Department of Architecture was invited to the final jury. During these jury sessions, Google Jamboard was used for presenting the works of the students and these Jamboards were open to all the students during the semester.

The course program was rigorously clear, students having the design brief and documents of each project a week before the start. Content and materials of each week was written in the design brief. Students were informed about the evaluation criteria in detail. Students got 1 point (out of 100) from their weekly submissions, where project submissions were 10 points each. No criteria were applied while evaluating the weekly submissions: Each student who made a proper submission on time, got 1 full point. For project submissions, evaluation criteria were content, originality, workmanship and time planning.

Other than the online class which was synchronous, students and the lecturer communicated asynchronously via email and Google Classroom. At the end of each project, the lecturer shared the selected works of the students via her personal Instagram account, to create continuous communication and to say "*still here*" as described by Kvan (2001, p.349).

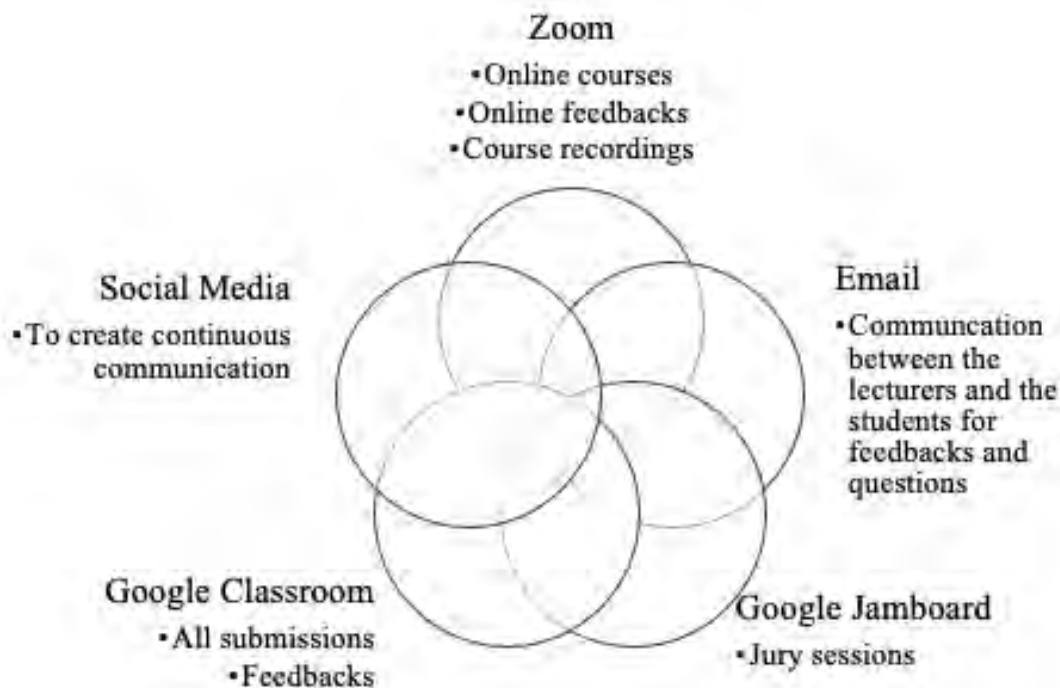


Figure 1. Online platforms used during the Basic Design Studio Course

Among all students who were enrolled in the basic design studio course, 14 of them voluntarily participated in this research study. Research took place approximately two months after the finals of the course. Semi-structured interviews were carried out by the lecturer (the first author of this paper) via Zoom meetings, each meeting took around 15 minutes and meetings were recorded. Although the focus was on the basic design studio during the interviews, it was aimed to explore the design studios as a whole. Open-ended questions about architectural education and studios courses were asked. The questions asked were (although not always asked in this order):

- What is a "design studio", what should be in the "studio"?

- What were your expectations about architectural education and studio courses when coming to the faculty of architecture? Then what was your experience during online studio education?
- What were the essential elements of a virtual basic design studio course?
- Have you had experiences such as “peer-learning” and “learning-by-doing” during basic design studio course? If you have had these experiences, how?

Interview data was transcribed and analysed separately by two of the authors using grounded theory techniques described by Strauss and Corbin (1998, p. 12). Strauss and Corbin (1998, p. 5) stated that analysis is an "interaction between researchers and data", that they are procedures that will help to standardize and provide accuracy to the analysis, but these procedures should not be followed strictly and should be used creatively and flexibly by researchers.

First, interview data was open coded. While working with the expressions used by the students, general thought patterns, repetition of certain statements, and content that dominated the explanations was coded. Secondly, axial coding was done to link categories together into a broader framework. At this stage coding occurred around the axis of a category, linking categories at the level of properties and dimensions (Strauss & Corbin, 1998). For example, codes related to the students’ expectations from a basic design studio were linked and categorized under “The expectations from a design studio and ways to realize these expectations”. The analysis continued with selective coding to link the codes created to a wider framework. With selective coding, categories were integrated and refined to themes. For example, it emerged from the axial coding that students hack some of features of a physical basic design studio, by using technological tools. Consequently, the theme named “hacking the studio” was formed and all related categories and subcategories were organized around this central explanatory theme.

Table 1. Coding process

Open coding	Axial coding	Selective coding
Design studio is: working, creating, interacting all together around “big tables”	The expectations from a design studio and/or ways to realize these expectations	The myths about the studio
Basic Design Studio is: a must-attend course		
Discord is: a place to work, create, interact		
Virtual design studios are: difficult that physical ones	The expectations from a virtual design studio	
Presenting 3D physical models of their projects with 2D visuals	Creating illusions of projects and the student herself/himself	Hacking the studio

Being able to close cameras, during the class and the jury sessions		
Having unlimited access to all documents, recordings and Jamboards all the time	Using the properties of technological tools to change the features of the design studio	
Getting feedback from the lecturer privately		

Results

Based on the analysis of the data, two themes emerged from the Selective coding: the myth of the studio and hacking the studio. What these students, who started their higher education in the 2020-2021 Fall Semester, were thinking about studio courses before starting their education and how they tried to turn some of these myths to reality, were defined as the myth of the studio. Furthermore, from the analysis of the interviews, it can be said that these students hacked the studio, by making some actions that they could not be able to make in a physical studio environment by using the technologies that they have.

The Myth of the Studio

Almost all the students described the studio as a space made up of people gathering around "big tables" when asked how they imagined the studio as a physical place. For these students, the most important feature of a "studio" is people, working, creating, interacting all together around big tables. One student mentioned that the studio is a place where everyone meets and talks with each other and in it, there are crowded friend groups. She added that even during the pandemic, studio education forced them to meet each other somehow. Another student defined the studio as a place that will be enough even if it has just the ground and said that inside a studio there may not be a table, a chair or nothing. She added that for her, the studio is a place where creative people work. A student mentioned imagining the studio as a laboratory where the works of their predecessors and the works of her own class will be displayed together. Others mentioned that in a physical studio, they imagine a lecturer in the middle of everything; teaching, commenting, interacting with the students equally. A student stated that she was thinking that studio was "an environment where there is information flowing around all the time, a place where that information can be felt without knowing it" before the start of the semester.

Two things helped these students to turn the "big table" myth into reality. First, due to weekly submissions on the same day of the basic design course, these students indicated the feeling that they must attend the basic design studio classes in real time, even if they do not feel obligated to do so with other courses. One student mentioned that since it was a studio lesson, there was no chance to close the computer and go away, they felt that they had to listen and do their project at that moment. She detailed that they knew that the more questions they asked during the lesson, the less their work would be later and the better they evaluated the lesson, the easier it was for their project to progress. Another student said:

"If we didn't do it in class, we wouldn't be able to, because sometimes we got to a point where we didn't even understand what to do, but we somehow did. There were projects that we finished without understanding anything, then when we look back, we understood. That's why it could be very challenging when you didn't do it in class."

Another reason for attending the online courses might be the students perceiving studio lessons as a place where creative people work. By attending classes on time and trying to create during class hours, they felt like they were interacting and working around a virtual "big table". One student stated that ideas are created in the lesson when students and lecturers talk all together, so she indicated that it is much better for them to start working in the virtual class. Another one declared that:

"Frankly, in the morning classes if we couldn't do anything together, we were mostly sleeping, because we were studying late at night."

Secondly, most of these students mentioned using "Discord", a digital communication platform designed for gamer communities. Students use this platform to create a virtual student community, with rooms named such as "studio", "library", "canteen" and they meet on this platform to study, to create and to chat. Moreover, they mentioned using WhatsApp group chats for continuous communication with their peers. A student explained their use of discord as:

"When someone is bored when she/he can't do their homework, she/he join our discord channel, and we help her/him. There, we do our homework together. I usually have discord open. If we are on the computer, a notification comes, informing that someone has entered the room, tagging us, saying "I need your help guys", so we help each other in that way."

Although this consequence occurs regardless of the progression of the course, the use of these virtual communication platforms affected peer learning in a positive way and helped these students to realize the "big table" myth in the conditions of the Covid-19 pandemic.

Another myth was that virtual design studios would be inefficient and more difficult than physical ones. Students stated that, when they learned that the classes will be online before the start of the semester, they thought they would have a hard time especially in the studio courses. But in the case of basic design studio, even if it was virtual, they stated that the lesson was efficient and understandable, contrary to what they expected. A student stated this as:

"Even though it's virtual, it worked just as I have imagined it."

One of the reasons for this was identified by a student as being able to easily communicate with the lecturer via email and the lecturer's quick response. Another student stated that:

"Communication is essential for virtual education. It would be very difficult, especially if we could not get a response from the lecturers via email."

Some other students stated that being able to watch the lecture recordings over and over helped them to understand the points that are not clearly understood in the lesson, and this would not be possible in the physical design studio. A student stated that when she missed the studio lessons, it is not enough for her friends to explain it, and it is beneficial for them to have the chance to listen to the lesson again.

Moreover, students indicated that having a strict programme of the contents and the materials of the projects in the basic design course increased the efficiency of the course. One student specified that planned lessons made the knowledge permanent. Another one acknowledged that:

"I think that it is very helpful that the program of the lecture was ready in advance and shared with the student. I was preparing the materials I was going to buy; I was trying to read and understand beforehand."

Another student stated that he usually had difficulty in doing the projects in the first hours of the lesson, but he started to do better in the following hours, and if they were in the physical design studio, not doing it at first would cause him to lose his self-confidence.

Hacking the Studio

Analysis of the interviews showed that some of the features of the physical studio classes were hacked by these students using the properties of the technological tools.

First of these hacks were done by the students who wanted to get feedback from the lecturer privately. Being generally not possible in a physical studio, students sent their works to the lecturer privately using the chat feature of Zoom platform during the class. Likewise, some of the students prefer to engage in critique via email, confidentially. Private interactions between the students and the lecturer affected peer-to-peer learning. One of them mentioned that after a while, her classmates started to send their works privately via Zoom chat, and there is nothing left for her to refer to. Another student detailed that *"they were not started as peers but rivals"*, because of not having face-to-face interaction, and that getting private feedback is a result of that. Another one stated becoming demoralized by seeing the works of the students who *"turned feedback process into a show"* by sending successful works during the lesson. This student added that she could only see her own work and what was shared on the computer screen in a virtual studio. Stating that if they were in a physical studio, there would be 70 people like her, and she could see who couldn't do anything as well as who could do well. Jones et al. (2020, p.20) stated that asking for feedback in an online studio causes the student to associate both their work and their online presence with an urgent call for help and added that announcing to other students that she/he "needs help" is not same as asking for constructive feedback in a physical studio.

Another way of hacking the studio is students being able to create "illusions". They were required to make 3D physical models of their projects but expected to present them with 2D visuals. This phenomenon created an illusion of reality, sometimes making unsuccessful 3D models with better presented visuals, successful. Lecturers have no chance to touch the models, they could only see the illusions. A student stated that since they've always shared

their projects with videos or photography, when she went to her friend's house and saw her real work, she understood that it was much different than its photo. Besides, a student stated that he initially thought that uploading the photos of his projects to Google Classroom would be just like a voucher of his work, but later understood that his projects would be evaluated with those visuals. Another student said that what they did was wasted "*without even touching anyone's hands*". At the end, their work which will be evaluated is not the work itself anymore, but just the visual representation of it.

Another hack done by the students and available via technology was being able to turn off cameras, during not only the online classes but also during the jury sessions. This hack created another illusion, but this time the illusion of the student herself/himself. As mentioned before, design studio has a socio-spatial character and there was a concern that this might be damaged in virtual platforms. Design studio is also a collaborative structure that requires interaction. In virtual platforms, students made themselves invisible by turning off their cameras, and in this way, they hacked the social, spatial, and collaborative structure of the design studio with their invisibility. In their "illusional presences", the design studio has started to become different from its previous versions: providing students a platform of collaboration and interaction in the absence, at least visually, which is why it was defined as a "hack" in this study.

A final hack that was done by students was having access to all student projects, recordings of online classes and Jamboards throughout the semester. In a physical studio, students usually have limited access to other students' work and previous weeks' classes. However, by the help of not only the technological platforms, but also the decisions of the university and the lecturers, students of this online basic design studio hacked the limits of access. They stated that they looked at the images uploaded to Classroom and Jamboard over and over before and after the juries, even after the term ended, that they examined what was right and what was wrong and indicated that this was very effective in their learning process. As Pektaş (2015, p.263) identified, one advantage of the virtual design studios is the openness of the process. Pektaş stated that the reason for this is that the design processes and student documents are shared temporarily in the traditional design studio, while as a result of the tools in the online studio, these were open to sharing in a way that allows students to observe the processes of other students and become more aware of the project needs.

Discussion

This study showed that without experiencing a physical design studio, students hack some properties of it and have factual myths about it which they tried to realize with the resources that they have. They imagine the studio as a social place. Many studies showed that developing social bonds among participants is an important part of developing a successful VDS. Jones et al. (2020, p.21) stated that having large proportions of students who are completely new to studio environment negatively affected the forming of the necessary habits from listening-in, social comparison and the development of community of practice. Iranmamesh and Onur (2021, p.259) identified that class discussions showed a similar trend to the tutor–student communication for 1st and 2nd year students, but the item targeting peer learning showed the lowest score. Kvan (2001, p. 351) quoted Vaitkus, pointing out that if there is anonymity, effective groups cannot be formed, that effective trust-based relationships cannot be established when members do not know each other, and thus peer learning is difficult when

the group is not established. Based on the findings of the present study, it can be stated that to help the students in a virtual basic design studio, the projects might not only focus solely on the content but also designing creative connections between students, between the students and the lecturers and between the students and the rest of the world. They need virtual social spaces.

How will studio hacks affect the future design studios? The nature of the virtual studio makes the student a kind of illusionist of his/her reality, being able to perform tricks that deceive the eye. Moreover, it affected the role of the instructor, in some cases making her/him another kind of illusionist. As Kvan (2001, p.353) stated, VDS changes the relationship not only between lecturer and student but also between student and the rest of the world. The technological tools used are a part of this illusion, setting the boundaries of interacting, sharing and in some cases producing and working. As Sagun et al. (2001) have stated, it is a fact that online education enables students to become aware of their control over human education by giving them some responsibilities and roles and they may experience problems they may encounter in the future and be ready for professional life. Moreover, as Sagun et al. (2001, p.334) mentioned, the power of the current technologies to store, index, search, transform and distribute information asynchronously can be adopted to improve the quality of hybrid studio classes. The process of virtual studios prepares these students to a future where they can make projects that in the absence of themselves, have the power of speaking for them.

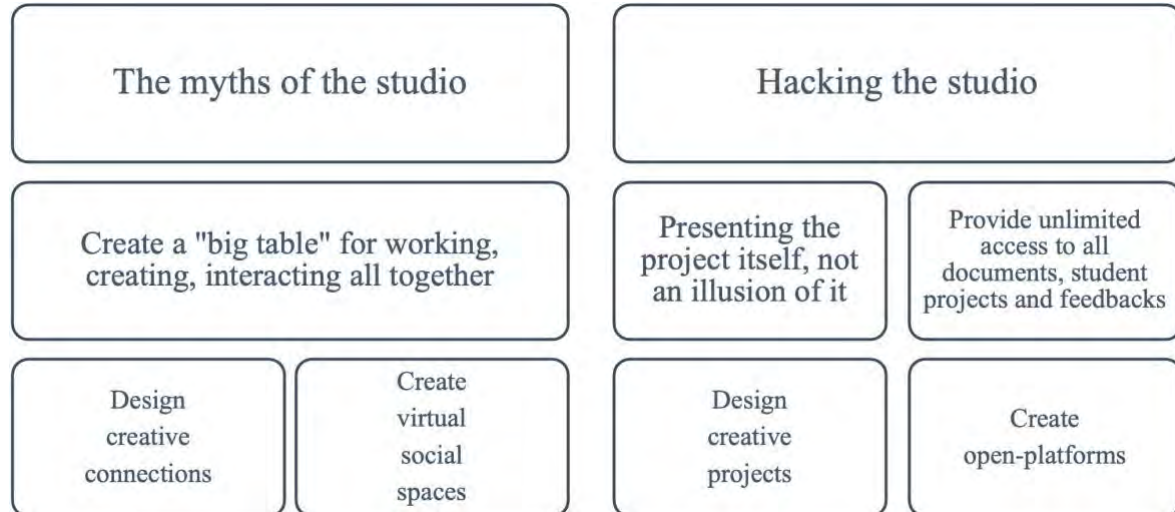
It is important to state that this virtual basic design studio was done during Covid-19 pandemic where there are strict curfew restrictions. The Government of Turkey announced restrictions due to Covid-19 pandemic and one of these restrictions that affected these students most was curfews for individuals aged 20 and below during the hours of 13:00-16:00. Moreover, some of the students or their relatives tested positive for Covid-19 and received treatment during the semester of the basic design course presented in this paper. One student stated that she started to feel like a mouse in a cage because of the restrictions during the same period, and after a while the fun of creating new projects started to disappear. Another defined that she sometimes experienced the "feeling of being inside a simulation". Therefore, it is necessary to note that there are important psychological issues that distinguish virtual design studios built during emergency situations from other virtual design studios. These studios are mostly the studios of the crisis period without full-designed tools and infrastructure.

Based on the findings of this study, it can be said that providing students unlimited access to all documents, student projects and feedbacks in the future will make positive contributions to both physical and virtual basic design studios. Moreover, creating an open online platform for feedbacks might help students get feedback without becoming rivals of each other, and to come back from time to time to look at the feedbacks. It should also be noted that all these might accustom students to having everything at their fingertips without effort.

One of the challenges of virtual design studios were students presenting an illusion of their projects. By using the Minecraft game creatively in his basic design course, Acar (2021) enabled students to create projects in a virtual environment and resulted with the virtual presentation of the project itself, not an illusion of a physical project. However, in this case the project itself was an illusion and students moved away from the physical world, turned into avatars in a

virtual world. To deal with this dilemma, lecturers need to ingeniously design the course to adapt to this new situation.

Table 3. Recommendations for future basic design studios



After all the experiences, it is a fact that design education will be different after the Covid-19 pandemic. Previous studies stated that students prefer a hybrid studio, rather than having solely a virtual or physical one; a studio in between, having the advantages of both, which is more efficient and related to the real world (Saghafi et al. 2012; Pektaş, 2015; Rodriguez, 2018; Iranmanesh & Onur, 2021). Consequently, instead of trying to draw a clear line between the virtual and physical worlds and compare the two, as design educators we should focus on building these hybrid studios, effectively.

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Ethics and Privacy Statement

To conduct the study, necessary written permissions were obtained from Istanbul University, Faculty of Architecture. All data collected and the identities of participants are strictly confidential. Unique identification numbers were assigned to all participants that were used throughout the data analysis process and reporting. During interviews it was outlined to the research participants how confidentiality and anonymity will be achieved and a verbal consent was taken before the interviews.

References

Acar, A. (2021, July). Çevrimiçi Zihin İşçiliği Olarak Temel Tasarım Eğitimi: Minecraft'tan Mindcraft'a [Basic Design Education as Online Mindworking: From Minecraft to Mindcraft]. Istanbul University Faculty of Architecture, Architecture Talks 4 .

- Broadfoot, O., & Bennett, R. (2003). Design studios: Online? Comparing traditional face-to-face design studio education with modern internet-based design studios. In Apple University consortium academic and developers conference proceedings 2003 (pp. 9–21).
- Clark, S. & Maher, M. L. (2005). Learning and designing in a virtual place: investigating the role of place in a virtual design studio. In Proceedings of eCAADe 2005 (pp. 303–10).
- Dutton, T. A. (1987). Design and studio pedagogy. *Journal of Architectural Education*, 41(1), 16–25.
- Gross, M. D. & Do, E. Y. L. (1997). The design studio approach: learning design in architecture education. In J. Kolodner & M. Guzdial (eds), *Design Education Workshop*, EduTech/NSF, College of Computing, Georgia Institute of Technology, September 8–9, 1997, Atlanta. Available from URL: code.arc.cmu.edu/dmgftp/publications/pdfs/edutech97-eyd.pdf (Accessed 20 April 2021).
- Ham, J. J. & Schnabel, M. A. (2011). Web 2.0 virtual design studio: social networking as facilitator of design education. *Architectural Science Review*, 54(2), 108–16.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause review*, 27(1), 1-9.
- Iranmanesh, A. & Onur, Z. (2021). Mandatory Virtual DesignStudio for All: Exploring the Transformations of Architectural Education amidst the Global Pandemic. *The International Journal of Art & Design Education*, 40(1), 251-267.
- Jones, D., Lotz, N. & Holden, G. (2020). A longitudinal study of virtual design studio (VDS) use in STEM distance design education. *International Journal of Technology and Design Education*. <https://doi.org/10.1007/s10798-020-09576-z>
- Kvan, T. (2001). The pedagogy of virtual design studios. *Automation in Construction*, 10(3), 345–53.
- Maher, M. L., & Simof, S. J. (1999). Variations on the virtual design studio. In Proceedings of fourth international workshop on CSCW in design (pp. 159–165).
- Maher, M. L., Simof, S. J., & Cicognani, A. (2000). *Understanding virtual design studios* (1st ed.). London: Springer.
- Pektaş, S. T. (2015). The virtual design studio on the cloud: a blended and distributed approach for technology mediated design education. *Architectural Science Review*, 58(3), 255–65.
- Rodriguez, C., Hudson, R., & Niblock, C. (2018). Collaborative learning in architectural education: Benefits of combining conventional studio, virtual design studio and live projects: Collaborative Learning in Architectural Education. *British Journal of Educational Technology*, 49(3), 337–353. <https://doi.org/10.1111/bjet.12535>
- Saghafi, M. R., Franz, J., & Crowther, P. (2012). Perceptions of physical versus virtual design studio education. *International Journal of Architectural Research*, 6(1), 6–22.
- Sagun, A., Demirkan, H. & Goktepe, M. (2001). A framework for the design studio in web-based education. *Journal of Art & Design Education*, 20(3), 332–42.
- Salama, A. M. & Wilkinson, N. (2007). *Design Studio Pedagogy: Horizons for the Future*. Gateshead: The Urban International Press.
- Schnabel, M. A., & Ham, J. J. (2012). Virtual design studio within a social network. *Journal of Information Technology in Construction*, 17, 397–415.
- Schön, D. (1985). *The Design Studio: Exploration of its Traditions & Potential*. London: RIBA Publications Limited.

- Sidawi, B. (2012). The impact of social interaction and communications on innovation in the architectural design studio. *Buildings*, 2(4), 203–217.
<https://doi.org/10.3390/buildings2030203>.
- Strauss, A. L., & Corbin, J. M. (1998). *Basics of Qualitative Research: Techniques and Procedures For Developing Grounded Theory* (2. ed.). Thousand Oaks: Sage Publications.
- Wojtowicz, J. (Ed.). (1995). *Virtual design studio* (1st ed.). Hong Kong: Hong Kong University Press.
- Yazıcıoğlu Halu, Z., & Kula Say, S. (2021). Pandemi Sürecinin Öğrettikleri ile Mimarlık Eğitimine Yeni Yollar Açılabilir mi? Veya Uzaktan Mimarlık Eğitimi Sadece Dijital Ortamda mı Olur? [Can New Ways Be Opened to Architectural Education with What the Pandemic Process Taught Or is Distance Architectural Education Only in Digital Environment?]. *Mimar.ist*, 70, 60–67.