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# Journal of Design Studio

## AIM

*The aim of the Journal of Design Studio is bringing different design studio researchers together on a multidisciplinary design studio research platform. This design studio research platform gives the researchers who made experimental studies in their design studio education to share their works with the other researchers in the same area or similar research fields. The scope of the Journal of Design Studios include all research and experimental works realized in all type of design studios.*

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Architectural design studio education,  
Design principles for studio work,  
Product design studios,  
Interior design studios,  
Urban design studios,  
Landscape design studio,  
Communication design studio,  
Graphic design studio,  
Media design studio,  
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New trends in design studios,  
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# Journal of Design Studio

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## Editorial

Ilgı Toprak 

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### Editorial

This summer, Journal of Design Studio has successfully completed two years of publishing. This issue covers eleven articles, including six research articles, a review article and four design studio cases.

The first research article entitled “Insight into a Personalized Procedure of Design in Concept Generation by the Students in Architecture Thesis Projects” by Rahman Tafahomi investigates concept framing and developing trends among students in architectural capstone projects – also referred as graduation project, final year project or senior project. The results indicate that students selected their own personal approach under the influences of the supervisors for conceptual design, using a subjective approach rather than a structured process.

The second research article by Guliz Ozorhon and Gulbin Lekesiz is entitled “Re-considering the Architectural Design Studio after Pandemic: Tools, Problem, Potential”. This article provides a framework of an adapted online architectural design studio enriched with environment-specific tools for online education. The components of this collaborative learning approach enable participatory production and allow interaction by means of workshops and seminars.

The third research article “Intuition in the Design Studio: A Perspective on Student’s Creativity and Design Process” by Zeynep Ozge Yalcin examines the role and the dimensions of intuition in the architectural design studio. The results of the study demonstrate that intuition has a crucial role in the design process.

The fourth research article entitled “Going Digital in Design Education: Restructuring the Emotional Bonds in the Online Studio” by Yasemin Burcu Baloglu and Ahmet Sezgin investigate students’ bonding with the architectural design studio, during the transition to online education by means of semi-structured interviews conducted with students from the faculty. Students discuss the effects of the transition process— notably changes in social relationships, time-space routines, safe space, and their perceptions of personal space.

The fifth research article is “Situated Learning in Online Architectural Studio Education” by Ece Buldan. The article aims to examine particular changes in the design studio when moved into an online environment, especially two aspects of the studio culture: “studio as method” and “studio as environment”. She investigates an online design studio based on the theory of situated learning.

The sixth research article by Zeynep Ceylanli, Elif Aktas Yanas is entitled “A Critical Assessment of an Extended Learning Environment in Interior Design Studio”. This exploratory research based on qualitative techniques assesses the students’ approach to design process in face-to-face and online experiential learning environment. The study aims to provide a new perspective to the interior design

students about space and user relationship regarding interaction and atmosphere, not only in terms of the given design problem but also the ‘environment’ they are experiencing through the design process.

The review article entitled “An Architectural Debate: The Dilemmas of Architectural Complexity in Design Studios and the Teacher’s Role” by Dania Abdelaziz argue that teacher-student interaction enhances the design learning as well as design teaching. It ensures students’ awareness of their roles as learners and the role of their teachers. Teaching-learning journey becomes more fruitful with increasing interaction between teachers and students, it helps students to boost their confidence and release their uncertainties.

The journal comprises four design studio case articles in this issue. The first design studio case by Pinar Sezginalp and Selin Ust entitled “Adapting to Living Space in the First Interior Design Studio” examines the case of online versus face-to-face learning experiences of two different groups of students as “initial experience of an interior design studio” – where they start to interact with classmates and encounter an interior architecture project for the first time.

The second design studio case article by Bilgen Tuncer Manzakoglu, Renk Dimli Oraklibel entitled “A Design Management and Design Thinking Approach for Developing Smart Product Service System Design: Projects from Online Industrial Design Studio” investigates three student projects as case studies of Smart-PSSs designed in three stages: system design, product design, and interface design. They argue that students achieve a more holistic approach of the design process, taking account of new expansions in industrial design.

The third design studio case by Waldemar Jenek, Glenda Caldwell, Jared Donovan, Veronica Garcia Henson, Matt Adcock, Mingze XI, Kavita Gonsalves is entitled “Exploring Immersive Technology to Design Architecture Empowering Marginalized People: A Case Study of Australian Postgraduate Design Education”. The study focuses on a case study investigating architecture students’ use of media architecture design with real-time-render software tools to provide solutions to people without permanent residence. This study is part of an ongoing PhD research at Queensland University of Technology, Brisbane, Australia.

The fourth design studio case article by Derya Uzal, Başak Eren is entitled “Adaptation of First-Year Architectural Design Studio Over Accessible Resources”. This study discusses the experience of MEF University First-Year Design Studio, through the use of essential resources and their possible adaptations for the first-year architectural design studio (second term) under COVID-19 lockdown regulations. They emphasize accessibility and materiality as Fundamentals of Design Studio, as attributes that must adapt to studio members’ changing opportunities and environments.

# Insight into a Personalized Procedure of Design in Concept Generation by the Students in Architecture Thesis Projects

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**Abstract:** This paper analyses the predominant trend between the students to follow, frame, and develop a concept in the architectural thesis design. The research targets to question how the students derive their inspiration from diverse sources and influencers into the architectural design concept. The research methodology was based on semi-structured questionnaires with Likert scale questions to analyse and interpret data through the Chi-Square test in SPSS software. The findings revealed that first, the students preferred to employ more symbolic and poetic elements for the design than real projects, second, to create their concepts under influences of supervisors and juries than research, third, to follow personal procedure than the structured process of the course. In conclusion, the results revealed that the students adopted a personal procedure under the influences of the supervisors to design a concept that is closely aligned with a subjective approach, rather than a structured research process.

**Keywords:** Concept Generation, Personal Procedure, Research Process, Students, Supervisors, Architecture Thesis Design Studio.

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## Introduction

An architectural thesis design project takes into consideration as an essential module to be passed by students in all level of the architecture program in universities although some departments call this course as a final year project, graduation project, or capstone project (Ghonim & Eweda, 2019). It is supposed that the final architectural project presents general knowledge, skill, and ability of students to design an architectural thesis project through research and problem-solving process. It means the thesis project includes specific qualities to demonstrate the capability of design decisions made by students in the architectural design process (Borden & Ray, 2006; Mauch & Park, 2003).

From another point of view, architectural thesis projects might observe as a collective knowledge through a wide range of collaboration with supervisors, instructors, juries, and peer students (Borden & Ray, 2006). The students are inspired by some or specific sources of inspiration to generate a conceptual idea for the architectural thesis project, which is modified by comments from supervisors, instructors, and juries.

## Problem Statement:

The students present a project-based thesis in the fifth year of the architecture bachelor program, which is regarded as the essential criterion for both graduation and accreditation. The learning outcomes of the program have designed to lead the students to multilayer of

thesis activities including studies, analysis, conceptualization, design, and details for the site and building due to the curriculum and the syllabus (DoF, 2014).

According to the curriculum, it is expected that the students carry out the research and survey, programming and conceptualization in the first semester, and in the following semester, they do the schematic design, architectural design development, and detailed design in the department of architecture at the University of Rwanda, (DoF, 2014). It means the students are involved in the problem-based-learning for the first time in the thesis studio. However, in other years, the structure of the design studios was more adapted based on precedents-studies to design the project, which is more adapted to the project-based-learning (UR, 2017).

In fact, the curriculum emphasised the research activities, critical thinking, and problem-solving in terms of the expected outcomes of thesis projects. For this reason, Groat and Wang critiqued the trends to finalize the design projects without research activities in term of the final output (Groat & Wang, 2002) although a new generation of technology and sustainability have created a significant requirement for research (RIBA, 2014).

According to the structure of the curriculum, it is supposed that the students present an architectural concept for the architectural thesis project through a process of research including precedents, context, and site analyses. However, the trend demonstrates that the students have a concept to develop in the first session of the thesis studio in terms of pre-concept, which was discussed profoundly by Lawson (2005). This trend could refer to a personal presupposition about a particular concept for design to fit the final thesis project. In this perspective, Dutton remarked that the education structure creates a specific state, which students resist following the formal curriculum and so, a hidden curriculum leads and guides the students toward the design (Dutton, 1991).

In this contradiction, the assumption of the research is drawn to investigate if there is an association between the thesis process and conceptualization in the architectural thesis project as the following hypothesis:

H0: there is no association between the architectural thesis process due to the curriculum and the architectural thesis inspirations.

H1: there is an association between the architectural thesis process due to the curriculum and the architectural thesis inspirations.

### **Studies about the Conceptualization**

The terminology of the concept implies both concrete object and abstract idea for the design (Ching F. D., 1996; 2015). Lawson argued that the design term indicates both production and process although the discovery of the design process has been a difficult task (Lawson, 2005). A comparative study on concept creation highlighted a specific stage in both engineering and architecture, which is called in term of concept (Taura & Nagai, 2013).

However, the designers revealed the confusion on the term of the concept. For example, Cikis and Ek criticized that although drawing is a system of thinking and communicating for designers and architects (Laseau, 2001), graphical products could less be transformable into words, and some of poetics could not transform into graphical images (Cikis & Ek, 2010).

The studies highlighted a variety of concept typology in architecture. For example, Van Bakel (1995) advocated the concept as three styles between architects including personal design behaving, situational design behaving, and international design behaving. Ching categorized the concept generation with five patterns, namely linear, central, radial, cluster, and gird or mixed (Ching F. D., 1996). In another point of view, Lawson applied the word 'schema' to explain interpreting the perceptions and experience in the past (Mugerauer, 1995) to

support the mind to solve the problem in the future (Lawson, 2005).

The studies confirmed a strong relationship between the concept, drawing skill, and design in architecture education. For example, Laseau proposed a linear process of drawing, abstraction, and presentation as the architectural thinking process (Laseau, 2001). Furthermore, Goldschmidt argued that the drawing represents a continuous process of developing of an idea from the primitive stage to the final product (Goldschmidt, 2004). Although Ciki and Ek emphasized the drawing as a final product for the communication (Cikis & Ek, 2010), Ullman recommended a process of conceptualization, functional decomposition, and a new functional concept generation (Ullman, 1994). This process also advocated in terms of the divergent and convergent stages in the creation of an architectural design concept (Lang, 1987). Based on this evidence, the idea of the Galle in terms of the drawing as a personal journey is considerably underpinned (Galle, 1999). Therefore, the meaning of the new form of the design represents a personal way of obtaining knowledge through personal interpretation (Cikis & Ek, 2010).

From a methodological lens, a wide range of the methods, techniques, and process applies in concept generation and development. The researchers defined this process in terms of application of the design objective, strategy, and tactic (Groat & Wang, 2002) by designers, architects, and artists to apply a mixed-method (Groat & Wang, 2002) or a personalized technique (Niezabitowska, 2018). In another example, the study theorized the design activities in terms of the research 'in design, by design, and for design' (Frayling, 1993, p. 5). There are multiple studies that highlighted the method of concept generation into two approaches including the problem-driven (Taura & Nagai, 2013) and inner-sense-driven approaches (Nichols & Stich, 2003), which the problem-driven applies for the decomposition approach based on the analysis process, however, the inner-sense-driven for the compositional phenomenon (Taura & Nagai, 2013) grounded on a combination. In other

words, the decomposition refers to the analytical activities by the designer in the early stages of the design; however, the composition implies to the accumulation of the personal perception of the designer in the design stage.

Taura and Nagai (2013) highlighted two general methods for the concept presentation including visual and linguistic. The visual method refers to an imaginary cognition process; however, the linguistic implies the lexicon and semantic expression. Nevertheless, a number of studies have introduced some criteria in terms of conceptualization process such as practically and novelty (Sternberg & Lubart, 1999), quality and novelty (Vargas-Hernandez, Shar, & Smith, 2010), usefulness and novelty (Sarkar & Chakrabarti, 2011), and values (Weisberg, 1993). Apparently, the level of the association of those elements with the conceptualization may differ according to the type of projects.

Lawson interpreted that the meaning of the design implies the process of figuring an anticipated action such as designing a structure, producing a piece of art, or a process in problem-solving (Lawson, 2005). Undoubtedly, the creation of a concept mentions as an inseparable part of the design process that may start from the personal perception about a certain topic and then to construct the foundation for the final product as a problem solving efficiently (Crowe & Laseau, 2011).

In the opposite point of view, another critical perspective believes that architectural design is a praxis based on social context than just a conceptualization (Anderson, 2014). The theory of social space supports this idea in terms of architecture as a social production through the reflection of politics in social life (Simone, 2004). From this perspective, the method and process facilitate both conceptualization and design to represent the social, cultural, and political trends in the context of design based on the perceptual aspect of the presentation.

The evidence revealed that either the subjective or objective point of view of the designers is represented through the concept of the design. For example, Palmer theorized that the

definition of phenomena is related to a certain level of awareness of the men as the subject to understand an object through perception (Palmer, 1969). In addition, Mugerauer interpreted that all architectural productions compose meanings beyond the objectives of the designers, which emerge in the architectural discourse through interpretation (Mugerauer, 1995). Furthermore, Lawson (2005) highlighted that the mind of the designer selects and archives the information in an active way based on the individual interests, in the interaction between the inner-sense and the external conditions. In the complex interaction between the inner-driven and external-driven factors, the differences between the individual perceptions appear. Perhaps, for this reason, Goldman concluded that the simulation technique could not fully represent the mind of the designer based on sense, feeling, and perception (Goldman, 2006).

Nichols and Stich on the analysing object-subject relations addressed two groups of the knowledge in the mind of the men including self-knowledge and other-knowledge. Self-knowledge refers to the awareness of the individual about self-requirement and ability, and other-knowledge implies the external environment conditions (Nichols & Stich, 2003), which Goldman mentioned that both aspects develop simultaneously (Goldman, 2006). Perhaps, it could question the differentiation between a known-knowledge and a presented-knowledge in any architectural production and presentation based on perceptual-representation and conceptual-representation (Carey, 2000).

In other words, the perceptual representation refers to the first contact of the men with environmental features to understand the specifications although the conceptual representation relates to the categorized items in the mind based on the causality, relationship, and rationale to recall for representation as a new idea in an interpretative approach (Mugerauer, 1995; 2014; Carey, 2000; Gardner, Kleiner, & Mamiya, 2004).

However, the studies present critics on the concept and design process in architecture education. In fact, despite the architectural design has changed widely, the tradition of the studio remained as a conventional approach in architecture schools. In this case, D'Souza and Madanovic argued that architectural design studios as a traditional style of the apprenticeship and based on the significant role of the instructors than research activities, which represented the architectural design as ability, intelligence, and personality (D'Souza, 2007; Madanovic, 2018). Moreover, Lawson claimed that the background of the theorizing of the design process has started less than half a decade in the architectural domain, and in this case, architects have done more prescriptive than a descriptive explanation about the design (Lawson, 2004), which made a gap for problem-solving in design (Lawson, 2005).

In a summary, seemingly, scholars believed in a process from concept generation to design, which differs between designers, architects, and artists based on the inner-sense driven or the problem solving driven. In detail, the inner-sense relates more to the subjective approach into the design with compositional methods although the problem solving indicates the objective approach in the design process with decomposition grounded on the analysis, which Figure one illustrates the relationship and reflects the contradictive issues for sufficient discourse as below:

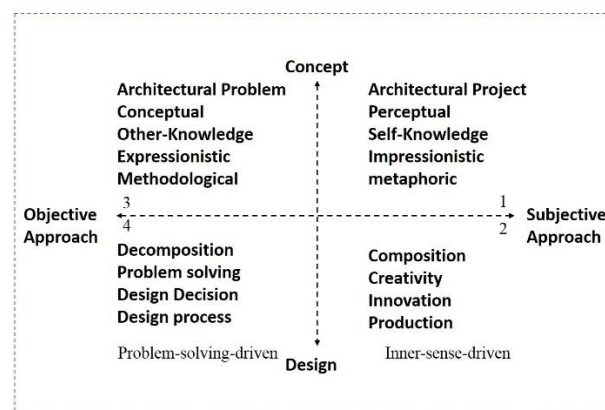


Figure 1: Overlaying of the Effective Factors on the Conceptualization

Figure one includes four parts. In detail, part one of Figure one demonstrates that the concept including some symbolic elements based on the subjective approach and personal perception. Those metaphors primarily reflect the inner-sense representation that could lead the designer toward innovation and creativity (part two). In the opposite part, the concept represents the architectural problem and real site condition based on the objective approach through the problem-solving-driven (part three and four). The diagram leads the methodology to discover the importance of those factors through data analysis.

### **Methodology**

The studies have highlighted some common techniques to study the students' activities in the context such as structured observation (Neuman, 2006; Lawson, 2005; Tafahomi & Nadi, Derivation of a Design Solution for the Conservation of a Historical Payab in the Redevelopment of Doloei, Gonabad, 2020), interview and questionnaire (Groat & Wang, 2002; Neuman, 2006; Alerby, 2000; Ezzy, 2002; Frankfort-Nachmias, Nachmias, & DeWaard, 2014), and simulation and graphical techniques (Laseau, 2001; Crowe & Laseau, 2011; Ching F. D., 2015; Tafahomi & Nadi, 2016). The questionnaire was applied to discover viewpoint, perception, and the expression of the students in the conceptualization processes (Lee, 2005; Yang, Becerik-Gerber, & Mino, 2013; Xi, Yuan, YunQui, & Chiang, 2017). This technique applied in other research in terms of research in architecture (Frayling, 1993), and aimed to explore the perception of students based on the learning activities, environmental effects (Bakare, 2012; Hemyari, et al., 2013; Frankfort-Nachmias, Nachmias, & DeWaard, 2014), and conceptualization process (Cikis & Ek, 2010).

Krippendorff recommended the interpretation as part of the content analysis to analyse the answers of respondents in the questionnaires (Krippendorff, 2003). For example, Moretti recommended analysing the meaning of the answers in the questionnaire (Moretti, et al., 2011; Elo, et al., 2014), in psychology, education, and sociology (Mayring, 2000) as an

unobtrusive method (Cho & Lee, 2014). The interpretation technique was advocated by Mugerauer as a technique in the built environment particularly architecture as an effective approach to explore the meaning (Mugerauer, 1995; Mugerauer, 2014).

According to the precedents studies, a semi-structured questionnaire with Likert scale questions was designed to discover the conceptualization process of the architecture students in the thesis studio. Some critical research targeted the reliability of the Likert scale (Joshi, Kale, Chandel, & Pal, 2015). However, the precedents on the Likert scale questions (De Campos, Pitombo, Delhomme, & Quintanilha, 2020; Huertas-Delgado, Garcia, Van Dyck, & Chillon, 2019; Li, 2013; Hartley, 2014) led the research to apply this technique to discover the correlation of the effective factors in concept generation to discover most effective factors on the conceptualisation process by the students.

To discover the process of the conceptualization in architecture thesis, the questionnaire was comprised of four critical component-questions as below in detail:

First, the source of the inspiration between the students was investigated such as architectural project, photos, site, natural elements, supervisor, symbolic items, poetic idea, cultural elements, and other items to discover the level of effectiveness of the subjective and objective factors on the inspiration.

Second, the effect of the thesis process due to the curriculum was discovered including before the research, the problem statement, studies, precedent analysis, context analysis, site analysis, data analysis, out of the process, and other items to discover the level of the problem-based driven factors and the inner-sense driven factors.

Third, the effective methods and techniques for illustration and communication were ascertained such as sketching, making a collage, physical model, tracing, notetaking, and other

items to discover the level of the methodological approach among them.

Fourth, the effective factors on the concept development were sorted including self-studying, self-sketching, self-digitizing, supervisors, juries, instructors, peer students, and other items to discover the effects of the external and internal factors on the conceptualization.

The questionnaire was grounded on five levels of association from the least score (1) to the highest score (5). The target group was comprised of 25 architecture last-year students in the thesis studio, the architecture department of the University of Rwanda. It was supposed that through comparison of the answers identify the trends between the students.

A small group of thesis students was asked to fill in the prepared questionnaires (pilot survey) to test and ensure the reliability after the validity check, carried out by group discussions with lecturers in the department. The outcome of these organized and in-depth discussions was constructive comments centred on integration, clarification, and configuration of questions. Following this, the questionnaire was uploaded on Dropbox for the response of the thesis students. The SPSS software version 20 was applied to analyse data collected, especially descriptive analysis and Chi-square test.

## **Results**

The results were explained in two parts including the frequencies of the answers and the Chi-square outputs based on the comparison of the answer to find the association.

### **Frequencies of the Answerers**

The students selected the 'potential site, architectural project, and supervisors', as the effective items as the sources of concept inspiration respectively. The students did not highlight other items such as 'photographs, natural element, symbolic item, the poetic idea, cultural elements, and others' as a source of inspiration.

The students expressed that they were inspired by many stages of the architectural thesis process including the 'site analysis', 'precedents analyses', 'studies stages', and the 'architectural problem statement' respectively due to the thesis module process. The students selected fewer other research stages such as the 'before the research', 'context' analysis', 'data analysis', the 'out of the research process', and 'others'.

The students applied 'sketching', 'physical model making', and 'note-taking' as the effective methods for 'illustrating and communicating the concept'. Other options such as 'collage making', 'tracing', and 'others' were selected less by them.

In addition, the students believed that 'the effective factors to develop the architectural concept' were 'supervisor', 'instructor', 'digitizing', 'sketching', and 'Juries'. Other factors took the position in the lower part in the list of the effective factors such as 'self-study', 'peer-students', and 'others'.

### **Summary of the Results: Frequencies**

The results of the analysis highlighted that the students took into consideration the real objects as the source of the concept than the subjective, abstract, and metaphoric items. In addition, they cited that they were inspired by the analytical stages particularly site and precedents analysis although they did not point out the context and data analysis. In fact, they followed the process of the thesis studio as recommended by the curriculum. The students applied sketches, physical model, and note-taking than other techniques to communicate the concept with the supervisors and the jury. Finally, they believed that their supervisors, instructor, and jury had the most significant role to develop and change the concept than self-studies and peer-students, which emphasized the importance of the studio authority than a personal journey.

Correlation between questions 1-2 including the source of the concept inspiration and effects of the research process on the conceptualization:



The Chi-square analysis identified that some items statistically were associated including the 'before the research' with the 'photos' ( $X^2=22.087$ ,  $df=12$ ,  $p<0.037$ ), the 'before the research' with the 'symbols' ( $X^2=24.239$ ,  $df=12$ ,  $p<0.00$ ), the 'out of the research process' with the 'symbols' ( $X^2=18.410$ ,  $df=9$ ,  $p<0.031$ ), the 'out of the research process' with the 'cultural elements' ( $X^2=21.638$ ,  $df=12$ ,  $p<0.042$ ), and the 'other' with the 'photos' ( $X^2=12.204$ ,  $df=4$ ,  $p<0.016$ ).

The Chi-square addressed the significant correlation between the 'before the research' and the 'out of the research' with some abstract items such as the photos, symbolic and cultural items in the process of the concept generation. In other words, the thesis process statistically associated with the concept generation although in the opposite way. It meant the students contradicted to follow the thesis process based on the interests of some abstract items. Therefore, it was observed statistical association and so the H1 approved.

Correlation between questions 1-3 including the source of the concept inspiration and the effective methods and techniques for the concept of illustration and communication

The Chi-square analysis identified a statistical association between some items including the 'sketching' and the 'photos' ( $X^2=25.008$ ,  $df=12$ ,  $p<0.015$ ), the 'making collage' and the 'photos' ( $X^2=32.689$ ,  $df=16$ ,  $p<0.008$ ), the 'sketching and the 'symbols' ( $X^2=17.376$ ,  $df=9$ ,  $p<0.043$ ), the 'tracing and the 'symbols' ( $X^2=21.290$ ,  $df=12$ ,  $p<0.046$ ). Other items statistically were not associated. According to the results, the students applied the sketching techniques as an effective method to illustrate those abstract items to bring them into an architectural concept for communication. Therefore, the sketching process was the part of the course, which emphasized the correlation between elements, so the H1 accepted and H0 rejected.

Correlation between questions 1-4 including the sources of the concept inspiration and the effective factors on the concept development

The Chi-square analysis identified a statistical association between some items including the 'photos' with the 'supervisors' ( $X^2=36.816$ ,  $df=12$ ,  $p<0.000$ ), 'symbols' with the 'supervisors' ( $X^2=19.264$ ,  $df=9$ ,  $p<0.023$ ), the 'poetic' with the 'studying' ( $X^2=29.058$ ,  $df=12$ ,  $p<0.004$ ), the 'cultural aspects' with the 'supervisor' ( $X^2=21.857$ ,  $df=12$ ,  $p<0.039$ ), the 'cultural aspects' with the 'Juries' ( $X^2=31.829$ ,  $df=16$ ,  $p<0.011$ ). Other items were not statistically associated. In other words, the supervisors were effective factors, which statistically associated with the photos, symbols, and cultural items. In the light of the statistical evidence, the H1 approved and H0 reject those items.

Correlation between questions 2-3 including the process of the research effect on the conceptualization and the effective methods and techniques for the concept illustration and communication

The Chi-square analysis identified a statistical association between some items including the 'sketching' with the 'out of the research process' ( $X^2=23.000$ ,  $df=9$ ,  $p<0.006$ ), the 'making collage' with the 'out of the research process' ( $X^2=34.889$ ,  $df=12$ ,  $p<0.000$ ), the 'tracing' and the 'out of the research process' ( $X^2=24.417$ ,  $df=12$ ,  $p<0.007$ ), the 'sketching with the 'other' ( $X^2=12.204$ ,  $df=3$ ,  $p<0.007$ ), and the 'making collage' and the 'other' ( $X^2=11.304$ ,  $df=4$ ,  $p<0.023$ ). The results of the analysis presented a statistical association between the research process and the methods of communication except for the aforementioned items, which also emphasized the deviation from the research process. Therefore, the H0 accepted and H1 rejected.

Correlation between questions 2-4 including the effects of the research process on the conceptualization and the effective factors on the concept development

The crosstab demonstrated a significant statistical correlation between those two questions. The results demonstrated a statistical correlation between factors including the 'sketching' with the 'before the architectural

research' ( $X^2=21.198$ ,  $df=12$ ,  $p<0.048$ ), the 'supervisors' and the 'before architectural research' ( $X^2=22.396$ ,  $df=9$ ,  $p<0.008$ ), 'supervisors' with the 'site analysis' ( $X^2=29.927$ ,  $df=12$ ,  $p<0.003$ ), the 'supervisors' and the 'other stage of the architectural research' ( $X^2=11.550$ ,  $df=3$ ,  $p<0.009$ ), the 'instructors' with the 'before the architectural research' ( $X^2=28.954$ ,  $df=12$ ,  $p<0.004$ ), the 'instructors' with the 'site analysis' ( $X^2=31.990$ ,  $df=16$ ,  $p<0.010$ ), the 'studying' with the 'data analysis' ( $X^2=26.360$ ,  $df=16$ ,  $p<0.049$ ). It meant that the supervisors and the instructors had an effective role to direct the students not only in the conceptualization and in the concept development processes, but also they led the students in both architectural thesis process and out of the2 process as the main effective factor. Therefore, the H1 approved and H0 rejected.

Correlation between questions 3-4 including the effective methods and techniques for the concept illustration and communication and the effective factors on the concept development Chi-square analysis demonstrated a significant statistical correlation between the 'comment of the supervisors' with the 'sketching' ( $X^2=23.741$ ,  $df=9$ ,  $p<0.005$ ) and the 'Comment of the supervisors' with the 'making collage' ( $X^2=27.827$ ,  $df=12$ ,  $p<0.006$ ). In this regard, despite other factors were not associated with the concept development, the results of the analysis revealed the importance of the role of the supervisors in the concept development process. Therefore, the H1 accepted and H0 Rejected.

### **Analysis of the Results**

The results identified a significant contradiction between the frequencies of answers and the chi-square outputs. In fact, the students highlighted physical elements as the source of inspiration for the concept generation. In the opposite result, the outputs of the Chi-square test addressed the significant correlation between the abstract items as the source of the concept generation in both 'before the research' and 'out of the research' process, which both items referred to a procedure out of the thesis process in the studio. Therefore, the contradiction of the

results could reveal a personalized procedure between the students to apply some abstract ideas in the conceptualization process such as photographs, symbolic items, and cultural elements in conceptualization process. Apparently, the abstract elements influenced the students either before the research or out of the research in terms of the architectural thesis process.

In addition, the sketching technique was the most effective methods for the students to represent, communicate, and develop the concept. Particularly, this correlation was appeared from one hand between the sketching and tracing and on another hand between the photos and symbols. It shows that the students were inspired by some abstract elements and ideas to vitalize them as the architectural concept. In fact, sketching was a communicative tool to interact between the students and the supervisors to develop the concept.

Furthermore, the research identified that the students followed the personal and perceptual process in the concept generation for in the architectural thesis project than a systematic process, which was proposed as the thesis module according to the syllabus and curriculum. In detail, the students started the concept generation for the architectural thesis project, before the starting of the academic year. It could highlight two important aspects; first, the students had a presupposition to develop for the thesis year, second, a subjective process of the conceptualization than the problem-solving approach. In other words, the students did not create the concept for the architectural thesis project through a definition of the problem, deep studies, and analysis. While the students preferred to follow the directions of the supervisors as the effective sources for concept generation and development. Perhaps this point could refer to a high level of effects the academic staff in a mastery attitude in terms of master of atelier than a systematic process for self-actualization.

From an interpretative lens, the results demonstrate another aspect of correlation,

which could slightly make transparent the relation between the contradictive results. In fact, despite the fact that the conceptualization activity was specific for each student in each case, the statistical analysis presented a detailed picture of the inspiration, methods, and development processes. Seemingly, there were some contradictory factors, which the architectural concept took the place among those criteria such as between the recommended process and the personal procedure or those analytical steps recommended as the analysing the data although the students followed their creativity. This gap was highlighted when the students did not refer to the contextual analysis as an effective factor. In the absence of the contextual observation, the students decontextualized the concept from the social and environmental factors but just based on their innovation, assumption, or presupposition. Apparently, the process of concept generation was affected by the prescriptive approach of the supervisors.

Nonetheless, the generated concept by the students took the position between those contradictive items to some extent, which some of the items recommended as instruction. In fact, the viewpoint of both students and supervisors about the thesis project determined the position of the concept between those dualistic aspects. Rearrangement of those contradictory aspects in the frame of the concept-design production and objective-subjective approaches resulted in the conceptual interaction as Figure two shows.

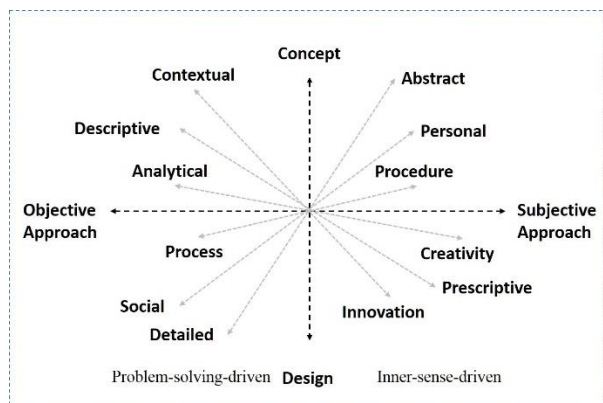


Figure 2: Interplaying the binary aspects of the concept generation

According to Figure two, concept generation takes the position between certain levels of the abstracted or detailed, which this level of precision is determined by the relativity between the thesis research process or individual procedure, personal interests, or social production. In addition, the contextual and analytical approaches led the students for depth achievement through a research process with a descriptive and communicative style. Moreover, the results could demonstrate three processes of the concept generation for the architectural thesis studio, first the proposed process through the architectural problem, analysis, and design decision; the second based on the observed attitude of the students through the abstraction, innovation, and personalization. Third, a mixed and flexible process was also observed. Nonetheless, neither proposed nor observed could be considered as a rigid process for concept generation and concept developments. In other words, those processes could overlay and overlap with an invisible similarity and apparently could observe some kinds of shifting between those two processes. Seemingly, the students found their way in the journey from concept generation to concept development and then design. Figure three attempts to illustrate processes.

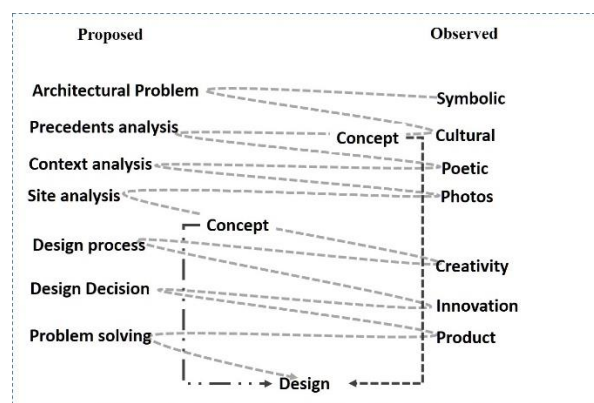


Figure 3: the Concept generation, Development and Design Movement

### Discussion

The architecture students applied some abstract sources for the concept generation, which revealed the depth influences of the symbolic and visual elements in the thesis

conceptualization. This achievement supported the findings of Lawson (2005) based on the theory of the selective mind of designers. Additionally, the students interpreted those cultural and symbolic elements to recall as the source of inspiration using the inner-sense approach. Thus, the students reinterpreted those abstract items to generate the architectural thesis concept similar to the theory of Mugerauer (1995; 2014) in terms of different levels of the interpretation. In this regard, the students used the subjective approach to generate the concept slightly similar to the finding of Nichols and Stich (2003), also with the composition (Taura & Nagai, 2013) form to integrate with the previous knowledge. Therefore, the findings of the research were in the same alignment to the theory of Van Bakel (1995) as the personal design behaving that in the research paraphrased in terms of the personal procedure in the design process.

The students utilised a wide range of the elements to understand and applied as a source to generate concept in the thesis that it approved the theory of Carey (2000) in terms of the perceptual representation. In fact, the students applied both perceptual representation and conceptual representation to represent the individual understanding (Mugerauer, 1995) about those metaphors. It meant that the students represented their perceptions about those inspired elements in the thesis studio according to the archiving process of the mind (Lawson, 2005). However, the students required simulation technique to communicate the idea based on the theory of Goldman (2006). For this reason, the students applied the sketching technique as the main tool for concept generation, development, and presentation. In detail, the students presented the concept for the architectural thesis through interpretative sketches (Mugerauer, 1995; 2014) to visualize the thinking process (Laseau, 2001), and transforming the idea to an image (Cikis & Ek, 2010). Nonetheless, the students formed those generated concepts primarily based on their own perceptions (Lawson, 2005) as a schema in a prescriptive way, which this process differed from the problem solving grounded on the critical thinking and social responding (Simone,

2004). It also could demonstrate that the students influenced by the cultural, symbolic and poetic items in the context even before systematic architectural studies.

The results highlighted some contradictive key attributes in the thesis process, which highlighted by other studies in terms of a binary way of thinking. For example, studies underlined the hypothetical items such as impressionistic-expressionistic (Gardner, Kleiner, & Mamiya, 2004), perceptual-conceptual representation (Carey, 2000), process-procedure (Lang, 1987; Groat & Wang, 2002), inner sense-problem solving driven (Nichols & Stich, 2003; Taura & Nagai, 2013; Lawson, 2005), design strategy-design creativity (Groat & Wang, 2002), verbal-graphical (Laseau, 2001), process-product (Goldschmidt, 2004), personal-social production (Simone, 2004; D'Souza, 2007), descriptive-prescriptive (Madanipour, 1996; Lawson, 2004).

Moreover, the research recognized a personalized procedure between the students to design their thesis research process. It meant they moved forward-backwards in the concept generation process to personalize the thesis process selective, adaptive, and flexible. In other words, despite the fact that the students were introduced to the research methodology, they designed their own research process based on the topics, interests, and challenges. This personalization of the research design was discussed with other studies such as the innovation (Ezzy, 2002), research strategy and tactic (Groat & Wang, 2002), the specifications of the research in art and design (Frayling, 1993), interpretation approach (Mugerauer, 1995; Mugerauer, 2014), practice in research (Silverman, 2004), and architectural research process (Niezabitowska, 2018).

### **Conclusion**

Application of the abstract sources as an inspiration for concept generation is the common trend among the students in architecture thesis in the department of architecture. The symbolic, cultural, poetic elements influence the students deeply even

before the starting of the thesis studio. Despite the fact that the students are introduced to the research methodology, techniques, and precedents analysis before the final year of the studies, the inspiration of the architectural concept is apparently dependent on the wider context than the department. Certainly, those metaphoric aspects have a deep root in the contextual aspects of the students, which the systematic thesis process influences less.

Despite the students expressed that they follow the thesis process to reach the source of inspiration for the concept generation based on the architectural problem, the results of the study revealed that they are influenced strongly by the contextual factors. The conceptualization' outputs revealed that the students are led by the cultural values through a strong belief, which those personal perceptions based on social and cultural context inspired them in the conceptualization process.

The students are influenced by different factors in the thesis process in terms of some paradoxical aspects of the concept generation, development, and design, which the concept took the position between those aspects. In fact, the activities of the students in the architectural thesis project identify that they present certain levels of either research process or research procedure. In detail, either the students apply various methods in the proposed process, or in the individual perceptual procedure, in which both process and procedure influence the concept as either an abstraction of a notion or a detailed concept for the project.

It is remarkable results to discover that the supervisors are the important factor in the modification, development, and changing of the concept. The supervisors are the most effective factor on the students in the conceptualisation and thesis processes. Therefore, the deviation of the students from the proposed structure of the architectural thesis interlocks with the approach of the supervisors to perceive the thesis process as a final year project with the apprenticeship approach than a thesis design with full of creativity and innovation, in which in the struggling between the thesis structure and push factors to modify the project, the students create

their own personal procedure to design the thesis project in the architectural thesis design studio.

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# Re-considering the Architectural Design Studio after Pandemic: Tools, Problems, Potentials

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**Abstract:** The Covid-19 outbreak has significantly influenced all disciplines from economics to politics, especially health, and forced every discipline to develop new strategies to adapt to this situation. For this reason, education has been suspended as of mid-March 2020 in our country; after the break, education methods have changed in a mandatory and rapid way and largely switched to distance education. This compulsory transformation has required the creation of new methods and approaches, especially for applied courses. In this context, this article focuses on a remote architectural design studio experience and explores this experience's problems and potential. This research is in the framework of an adapted architectural design studio setup enriched by authors with online environment-specific tools, including components that centralize participatory production (collaborative learning approach) and enable interaction such as workshops and seminars. The studio (201 A) was experienced in the 2020-21 fall semester by remote conducting with 2nd-grade architecture students. In the article, the process is revealed in detail, and the architectural design studio has been discussed extensively with the student survey and the instructors' experiences. As a result, it has been observed that the studio's components, such as interaction, collectivism, multilayeredness, dynamism, making criticism, and juries, can survive in distance education. Although verbal communication difficulties were experienced in the remote studio, visibility/screen sharing supported the communication throughout the process. However, it is obvious that the content, methods, and tools for remote architectural design studio education should be developed with a different and new approach than face-to-face education. In order to develop more effective methods in this scope, research is required to continue, prepare a large number of experience environments supported by these studies and, most importantly, share these experiences.

**Keywords:** Remote education, Architectural design studio, Covid-19, Virtual design studio.

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## 1. Introduction

In the last year, a concept has entered our language that we have hardly ever used and that many of us have never known before. Pandemic!... It quickly surrounded our lives, caused us to question our habits, and began to transform all activities. Almost every discipline has been compelled to develop strategies to adapt to this unusual situation within its

dynamics. All media and actors, from economy to politics, especially health, rearranged their practices; education methods and ways of doing business have changed. Moreover, in all this process, it became essential to be/stay at 'home' and to become qualified in solving all social and vital needs within the safe boundaries of the 'home'. Working from 'home', shopping from 'home', socializing at 'home', getting education from 'home'...

Of course, universities, like all institutions, were in the same situation. At first, distance education was a new subject for many of us, even though we were in the 21st century. Some applications were encountered, but there was no standard way until the pandemic. Moreover, it was a method that academia mostly kept their distance and believed that it had/could have many deficiencies. However, the possibility of education being interrupted forced us all to this method. The first experience (which was the 4th week of the second semester of the 2019-2020 academic year after the first encounter with this pandemic) required rapid adaptation, the curriculum and methods were already planned, and they were also started to be implemented. Therefore, the structure designed according to face-to-face education has been able to continue with distance education opportunities without significant changes. However, right after realizing that the pandemic is a long-term process, the 2020-2021 academic year was handled more comprehensively this time and was programmed according to distance education conditions. Each university has tried to choose the tools and methods appropriate to its structure and develop strategies to use them effectively and as competently as possible. However, there has been a more painful

process, especially in applied courses and programs where these courses are concentrated.

### 1.1. Methodology

This article focuses on an architectural design studio experience conducted remotely due to pandemic conditions and investigates the problems and potential of this experience. The method of the investigation was detailed in Figure 1. Accordingly, the question "how should architectural design studio be after the Pandemic?" is the first step of research. To answer this question, firstly, the nature of the architectural design studio has to be revealed: What kind of environment is an architectural design studio? What are the components of the architectural design studio? In order to provide a comprehensive answer to these questions, literature research has been conducted on the subject, and the experience of researchers has been utilized. On the other hand, remote education subject and experiences have been investigated both in general and in architecture education; these investigations are presented in the second section of the article. Under the guidance of this research and the instructors' experiences, an adapted studio model was designed. That model is applied in the second-year studio on the Özyeğin University

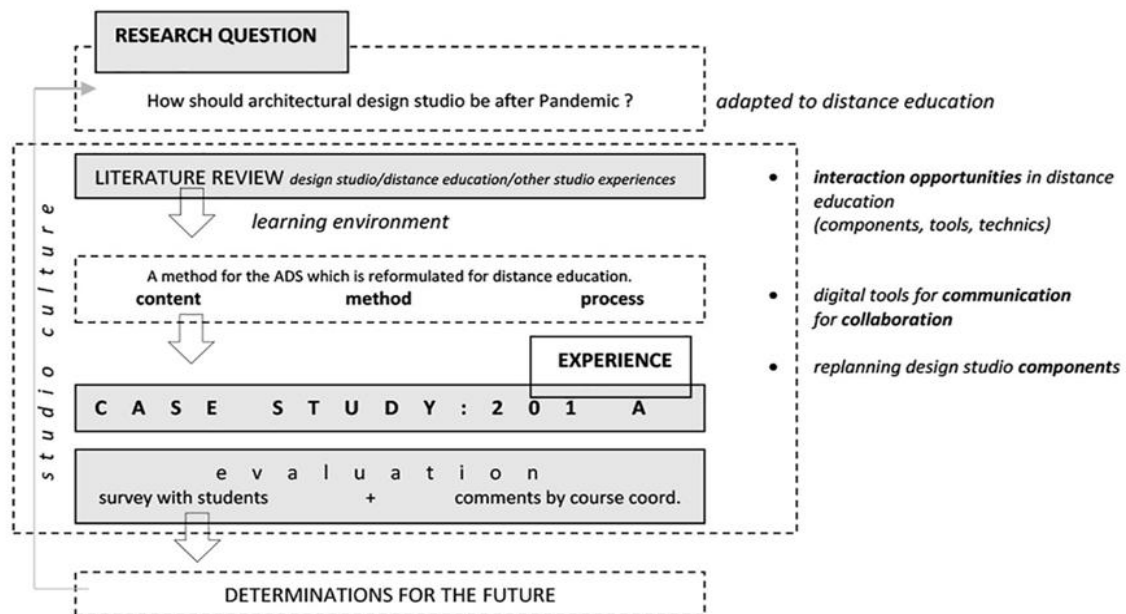


Figure 1: The framework of the article

department of architecture. In the third section of the article, this model is presented in detail with all its components. It was evaluated with the student questionnaire and instructors' reviews at the end of the semester. In this way, the problems and potentials encountered in the remote education process in architectural design studio practice were revealed.

## **2. Architectural Design Studio and Remote Education**

The primary pedagogical approach in design education is specified as a studio-based approach (Dreamson, 2020; Fleischmann, 2020a). Architectural design studios form the backbone of architectural education, where students synthesize and use the technical and theoretical knowledge gained in other courses. On the other hand, the traditional design studio is a physical space and has a pedagogical system. This system includes an education model based on learning by doing, in which students take part as reflective practitioners (Schon, 1984).

In terms of recognizing a problem, exploring for an architectural purpose, handling contextual influences, and negotiating programmatic demands, the architectural design studio is the first environment where students are faced with problems of immense complexity (Caglar & Uludag, 2006). The nature of contemporary architecture design studio is based on students' experience on a given design problem. Because of this nature of the studio, the design-related skills and fundamental inclinations that are acquired in these studios influence the future designing actions of the students (Kararmaz & Civavoğlu, 2017). Design studios are active spaces where students take social and intellectual actions such as drawing, communication, modelling (Saghafi, Franz, & Crowther, 2012). Also, design education is a very interactive process (Fleischmann, 2020b). Studios are social learning areas where students interact between themselves and with the instructors. The architectural design studio's learning environment is a culture where instructors and students share their experiences (Yurtsever & Polatoğlu, 2020).

On the other hand, the rapid development of information and communication technologies has affected traditional educational models, and remote education or blended education models have begun to come up. The design studios were also affected. The inclusion of technology in design studios was realized with web-based tools and 3d virtual worlds (Gül, Wang, Bülbül, Çağdaş, & Tong, 2009). In the literature, blended education experiences and virtual studios are also found before the pandemic. In the blended education model, the traditional studio method is supported by online digital media (Fleischmann, 2020a). For example, in the study by Gül, Wang, Bülbül, Çağdaş, & Tong (2009), the blended education model created by the use of collaborative virtual tools allowed two studios in different geographies to co-produce. Virtual design studio trials also occur at different times in the literature. According to Çağdas & Tong (2005), the first comprehensive virtual design studio was the collaboration of six designers in different locations in 1994. In the last two decades, virtual design studios have become more accessible (Iranmanesh & Onur, 2021). However, the traditional approach of architecture training has slowed down the widespread use of virtual studios. Aydınlı (2016) also underlines that the reflections of the transformations of technological developments in the practice of architecture have shown relatively slowly in architecture education. Although there are significant technological developments in this area, the studio model is still preferred in architecture education, where practical, face-to-face interaction is continuous (Fleischmann, 2020a).

However, the global COVID-19 outbreak has necessarily accelerated the adaptation of architecture education to the virtual environment, requiring creating online education environments at a rate that would not usually occur (Dreamson, 2020; Varma & Jafri, 2020). This sudden transformation of the education method has led to several challenges for educators who maintain the traditional on-site education model and are not familiar with online learning and teaching methods (Dreamson, 2020). The availability of hardware

and software platforms, network connectivity, digital divide, low interaction, lack of concentration, fatigue, and time management issues have emerged as initial problems. Some of them are caused by sudden transformation and lack of familiarity, while others are problems that can be overcome by the careful planning of the instructors (Varma & Jafri, 2020). Some studios have attempted to continue the setup -almost unchanged- carried out during face-to-face education as much as possible in the distance learning process. However, some studios have tried to develop an online environment adapted setup and use the potentials of this environment to create solutions to the problems of this environment. For example, Iranmanesh & Onur (2021) examined architectural design studios from different semesters and stated that the studio setup consisted of a cycle of online submission, virtual meetings, screen-sharing, feedback sessions, and class discussions in general. Ceylan, Şahin, Seçmen, Somer, & Süher (2020) stated that physical studio's all activities related to the design process were transferred to the remote studio. Also, they noted that the preferred communication platform (Adobe Connect) was insufficient for the interactive and shared environment in the studio from time to time, so the studio was supported by different drawing and modeling software. Ockerti (2020) said that "Efficient learning can take place in any environment; educators are tasked with adapting to the new environment, thinking about new methods and tools."

What issues have distance education replacing face-to-face education raised in terms of the architectural design studio? The major change in the transition to online education is the physical removal of the studio environment and participants (Yorgancıoğlu, 2020). While the physical studio environment is a shared place equipped with social interactions, each student/participant in remote education is available in their personal space (Yorgancıoğlu, 2020). On the other hand, accessing all online resources from anywhere at any time, the possibility of synchronous or asynchronous communications has led to a significant improvement in flexible learning. There is no

doubt that more problems were encountered when both the student and instructor had not had a similar experience before (the pandemic period is also that kind of experience). For example, the student should be aware that he cannot be passive in an internet-based studio, while the instructor must adapt to technological equipment (Sagun, Demirkan, & Goktepe, 2001). The technological challenges encountered during the transition to remote education are combined with computer deficiency, internet access problems, psychological and emotional problems. The disruption of the adopted pedagogical approach has led to concern among the instructors and students (Yorgancıoğlu, 2020). With the transition to remote education, it was observed that the time and workload spent by many design studio instructors increased (Yorgancıoğlu, 2020). Fleischmann (2020a) stated that students' most challenging issues are lack of motivation and social isolation. The reduction of informal communication among students also appears as a negative aspect of the online studio (Iranmanesh & Onur, 2021). Similarly, according to students' opinions from 25 different architecture schools, the lack of peer learning and peer support in distance education was the most negative aspect of the remote studio, and the negative effects of this situation on mental health were emphasized (Grover & Wright, 2020). Fleischmann's (2020a) research with students from different design disciplines found that the students' favourite aspect of online education is about getting more feedback from instructors and peers. According to the study conducted by Iranmanesh & Onur (2021), it was observed that students' ability to do individual research and use computer-aided design programs increased. According to the findings of Ceylan et al. (2020), the students found it positive to be able to watch the recorded studio lectures again and thus stated that they kept their concentration high during the lesson. In addition, Grover & Wright (2020) reported that, according to the common opinion of studio instructors, online education has a positive effect on acoustics and noise control, punctuality of students, and timekeeping in training.

### 3. Experiencing Remote Education in Architectural Design Studio

What happened at the architectural design studios during the pandemic? Some academics thought that remote education could be possible in a design studio, but it was a big question mark for the other group. While the world was trying to adapt to the pandemic and develop/change itself, architectural design studios did the same thing. What problems did remote education bring to the architectural design studio? With another look, could this crisis create new possibilities?

#### 3.1. Studio 201 A

The interaction between the instructor and the student, and among the students and the studio's energy arose by this interaction, is one of the essential components of the design studio. How can interaction be achieved in online education with a group that cannot physically share the same space, also some of them even never meet with each other? How can this interaction be

prevented from weakening due to lack of face-to-face and physical expressions?

The studio setup (Figure 2.) presented in this article was built on these questions and applied in Özyeğin University, Faculty of Architecture, Architecture Department in the fall semester of 2020-2021. Studio (201 A) was maintained with fourteen students, a faculty member, and a research assistant, and horizontal relations were established with other studios in two juries held during the term. The 201 A was planned in the scope of the course plan and its objectives; the subject was set as "children and space". The program developed within the framework of the study subject has been enriched with tools specific to the online environment. The methods and components used are mentioned in detail in sub-headings.

201 A Studio has tried to design a method that recreates the studio atmosphere with online opportunities and includes the competencies

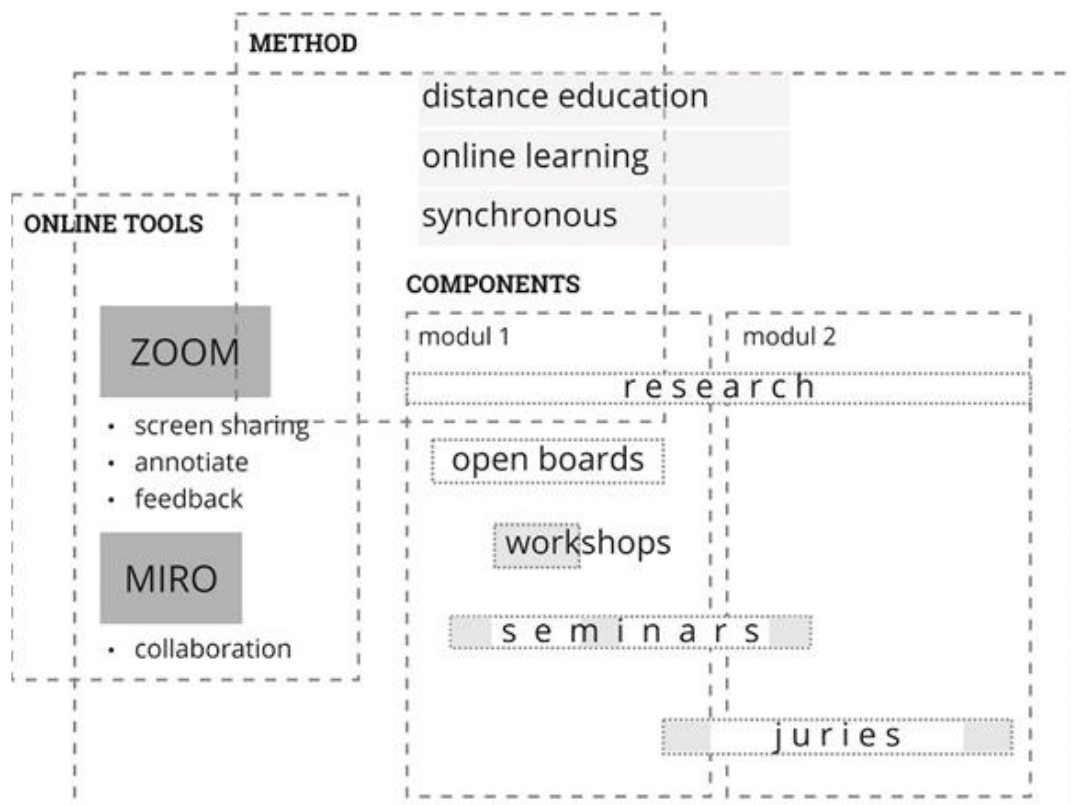


Figure 2: Method, components, and tools of the studio

that the studio should provide to students according to its location (Second Year, First Semester) within the architecture education (Figure 2). In this context, a remote synchronous education program<sup>1</sup> has been implemented. Besides, the lack of motivation and depression of students due to the pandemic conditions have been the factors that educators should consider. It is aimed to create dynamism by editing the combination of different components in the studio process. Different exercises and methods have been introduced to support the students' intellectual skills, especially in the first module of the two main modules. These methods can be listed as research, reading, writing, creating concept maps, seminars, and workshops. The method and components of the studio are described in more detail in the next section.

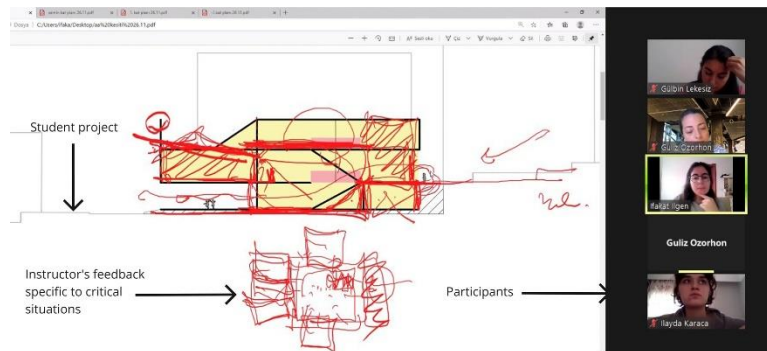
### **Adaption of Feedbacks and Juries to Virtual Environment**

The remote education model uses two different communication methods: asynchronous and synchronous. Courses can be performed as asynchronous, synchronous, or a combination of both. Asynchronous one does not have a

supported with various visualization interfaces. This model requires a specific time to be defined.

In design studios, crits form most of the dialogue between the instructor and the student. This process in which student production is discussed is a cycle of continuous impact and response. This interaction is an important feature that separates architecture studios from other disciplines' educational approaches (Fleischmann, 2020b).

Giving feedback through sketches on paper in the traditional design studio requires different digital tools to be included in the virtual studio. In Zoom, students digitally presented their projects through screen sharing, and the instructor could give feedback with a variety of digital drawing tools (Figure 3.). The problems of online education related to technical hardware and infrastructure such as Internet break, synchro distortion are encountered here from time to time. Furthermore, there are communication problems in these cases, so it can be challenging to understand the crits. However, all students' ability to easily follow



*Figure 3: Giving feedback*

simultaneous transmission of communication and information; communication is carried out with various electronic correspondence tools. Participants do not need to be online simultaneously in this method. In the synchronous communication model, users in different locations are constantly interacting. Communication via video and microphone is

their classmates' crits and join the dialogue between the instructor and the student is a positive aspect of online feedbacks. The survey found student opinions in this direction (detailed in section four).

<sup>1</sup> Remote synchronous education is called the case where students and teachers interact simultaneously using the Internet from different locations. In this way, students and teachers can use virtual classes, auditory or visual tools to ask questions, get answers, use multimedia resources provided in the course content, present, communicate with other students or teachers (Çavuşoğlu, 2013).



Two juries were carried out during the 201 A studio period (Figure 4.). Three different groups worked in parallel branches on similar issues assembled in these juries. Juries, an indispensable part of design education, have a significant and essential place in virtual studios. In fact, jury and such tools are much more important because the ability of students in different groups to meet/communicate in the workshop and/or in other places, to observe each other's production is eliminated in online education. Another advantage of online juries is that jury participation from different locations is facilitated. The students' opinion on this issue was that they could listen to their peers' crits more easily.

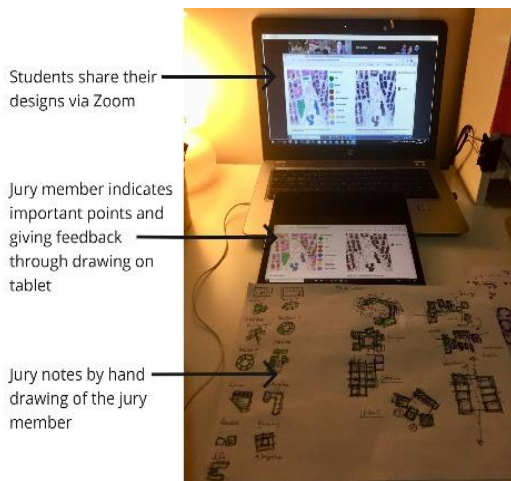


Figure 4: Juries

### Transformation in Architectural Presentation Methods and Tools

Sketching is a design tool that the designer refers to in expressing first ideas and creating concepts. Design tools have also transformed as a result of technological advances. It is becoming common for architecture students to use computer-assisted presentation techniques. The production of digital presentation materials has not been one of the challenges of remote education. On the contrary, students have expressed that saving printing is a positive aspect of the virtual studio. Besides, different presentation materials have been produced

using the potential of digital tools in the studio process. Students have been encouraged to create alternative dynamic presentation items such as video and gif.

### Online Tools

The main channel where studio structure was created and communication was established with the student was Özyeğin University LMS (learning management system). Weekly documents, zoom links shared with students via LMS, and students' submissions received via this system. Synchronous courses were conducted on Zoom on the day and time of the course. The recorded courses or seminars were shared with students through the Panopto. Students used computational tools that they chose within their skills and knowledge for individual production. In the studio's open boards, which is a widely referenced channel, especially in the early period, all participants worked on the same program simultaneously.<sup>2</sup>

### 3.2. Studio / Content, Method, and Program

This article discusses an online studio with all its components. Although the article's primary motivation is to focus on remote education experience in the architectural design studio, making the method understandable will only be possible with the combined evaluation of content, programs, and studio outputs. Therefore, in this section, the content and program of 201 A will be presented in the context of the studio method.

It is identified İstanbul/Koşuyolu as location and "Children and Space" as a subject in 201 A studio. Therefore, the studio has carefully looked at children and space in –metropolis-Istanbul, including children in the city, children in the metropolitan area, children and space in present-day İstanbul. An architectural program or typology was not given to students in the studio to conduct their research freely. Instead, concepts such as dreaming, exploring, learning, growing, and key actions such as art, sports, games, books –students can recommend more– are listed to guide students. Students developed

<sup>2</sup> Miro is the online collaborative whiteboarding platform that enables distributed teams to work effectively together, from brainstorming with digital sticky notes to planning and managing agile workflows (miro.com).

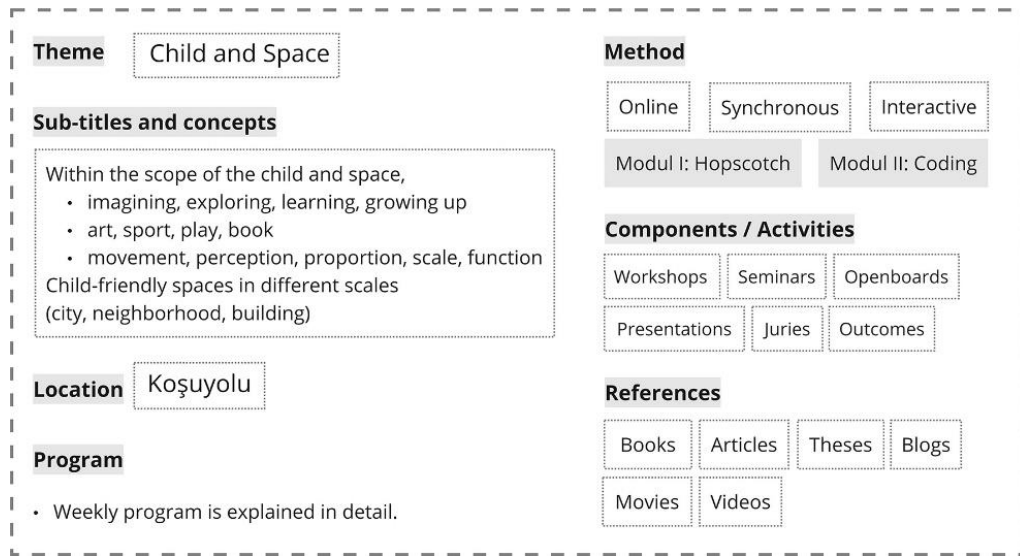


Figure 5: Content of the information sheet of the studio

scenarios and program through sometimes collective, and sometimes individual studies and spatial organization and structural constructions are designed to be compatible with this program.

It is important that students (especially now, with the reason of online education conditions that involve many ambiguous situations) should see/understand the semester ahead of them in the first course/meeting as clearly as possible. The first zoom meeting was to get to know<sup>3</sup> each other and share the course's content, schedule, and method with a detailed information sheet (Figure) with the students. These sheets are the meeting sentences to be established with the student in the design process, which is addressed with the various dimensions such as conceptualization, forming design principles, form, function and technology integrity, indoor and outdoor relations and organization, evaluation of environmental data in design (Özsoy, Çağdaş, Kocagil, & Sönmez, 2000).

The studio content is constructed into two multi-layer modules: (1) hopscotch, (2) coding (Figure 6.). The first module focuses on creating the research ground of the design studio - step by step - and the emergence of critical decisions on topic/context; the second module focuses on the development process, detail, and representation of the design.

### 1. Modul / Hopscotch

Modul 1 covers the period from the beginning of the semester to the first jury. The scope of this module is for students to understand the subject and to develop their original ideas. In the process, the studio topic "children and space" was researched with many tools and examined in-depth with different dimensions. For this review, film<sup>4</sup> and short videos were shared, and texts were read on "child" and then "children and space". This module is the basis of the studio, which results in students producing their strategy and scenarios and demonstrating their first design ideas through them. Students were expected to present comments and suggestions with different instruments such as sketches, posters, animations, and short videos in this module.

<sup>3</sup> The definition here includes both the brief self-introduction of each participant and understanding the knowledge and gains of students through a small exercise.

<sup>4</sup> For example, 95cm: Mega City's Mini Citizens, filmed by MAD (Center for Spatial Justice), which tells about the daily life of children in Istanbul through their eyes.



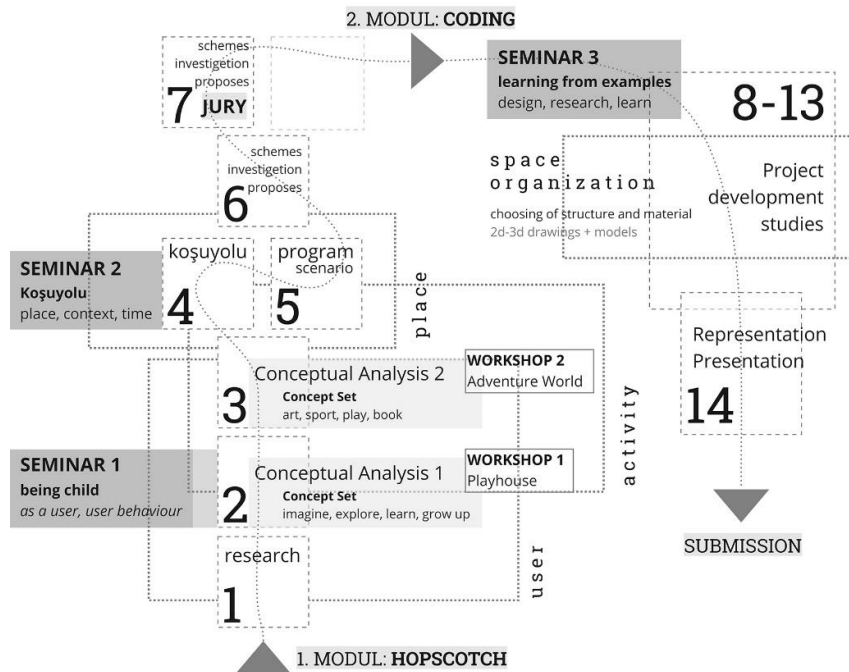


Figure 6: Setup of the studio

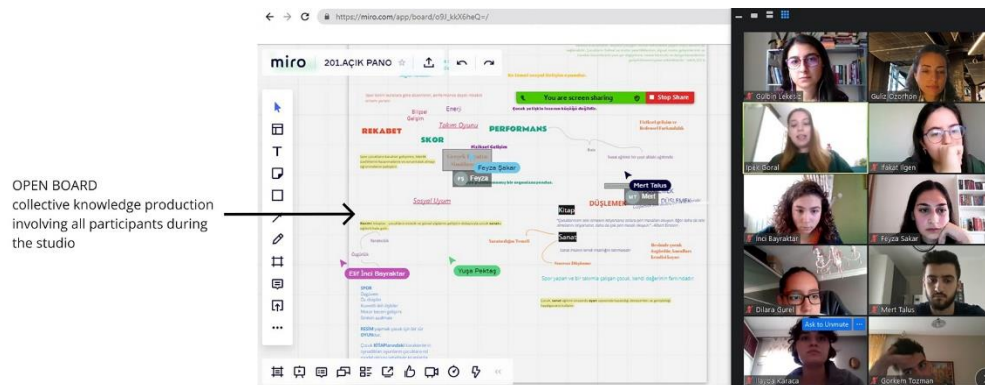


Figure 7: Open board

This module includes tools to create collective thinking/producing opportunities in the studio environment. One of these tools is the "Open Board"<sup>5</sup> (Figure 7), which works on a common file simultaneously, allowing students to combine their research results and individual comments in a holistic way. A shared folder has been created for the faculty members' recommended studies and the publications that students have achieved through their research. There are also two short workshops in this

module. It is clear that workshops that support different stages of the design process have significant contributions to the studio. Similarly, short workshops within 201 A have been critical steps in the dynamic structure of the studio process. This one day of short exercises allowed students to think multilayered and holistic about a design problem while also experiencing different design process steps (analysis, synthesis, and decision making). Furthermore, workshops' contents were planned

<sup>5</sup> In order to create these boards, an application called Miro that allows multi-participant digital work simultaneously was used.

to allow students to develop different perspectives for the studio's subject "child". The first workshop has been developed to raise awareness about the child's ergonomics, the size of children, and dimensions' spatial provisions. In this study, students were expected to design a playhouse that responds to the child's basic needs (such as dreaming, exploring, learning, growing (Figure 8.). The second workshop was

In this module, two invited seminars have been organized to support the studio. In the first of these seminars, the title of "Being a Child", a comprehensive sharing about children, different childhood stages, and child-space interaction, was carried out by a psychologist Ö. Yaşar. The second seminar was the seminar titled "From Yesterday to Today Koşuyolu", which was given by F. Öncel in the early period of students'

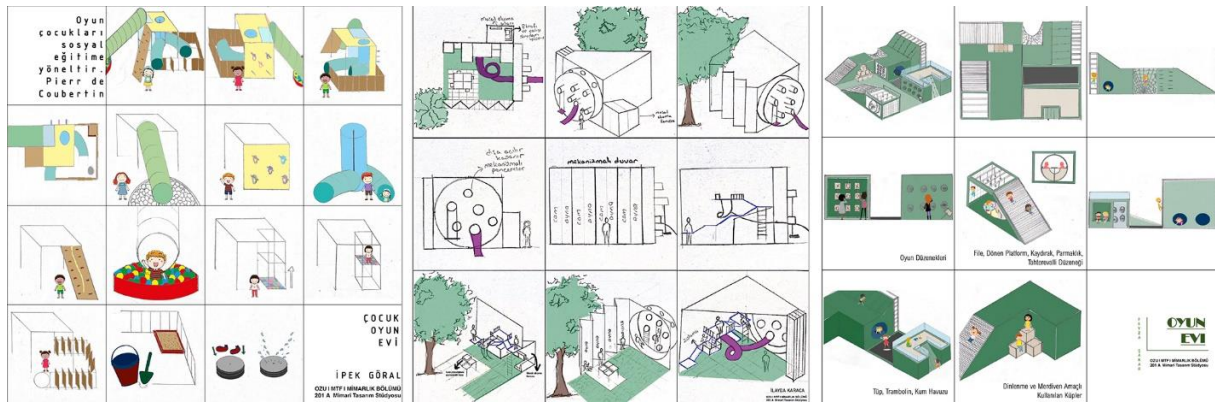


Figure 8: Three outcomes of the first workshop (Playhouse)



Figure 9: Snapshots from the videos produced in the second workshop (Adventure World)

planned at the centre of children and movement. This time, students were expected to create an incomplete world<sup>6</sup> –a space– that allowed children to participate in the 'action' focus (with arts, sports, games, and book keywords) (Figure 9.). Students have been offered a variety of key concepts in both their research and workshops. Through these concepts, they have been expected to develop ideas/programs specific to the architectural problem.

research on the site. The transfer of information in these seminars is significant for the studio because there is no chance to observe the user (child) and make technical trips to understand the location (the Koşuyolu) because of the pandemic conditions. In addition, students have easy access to the location's basic information through web pages and various channels (such as aerial photos, street views). One of the main reason the place was chosen as Koşuyolu was

<sup>6</sup> This workshop was inspired by Francoise Bilgin's article "Children in urban space, a place for children: Adventure areas".

the diversity of remote access to information about this place.

## **2. Modul / Coding**

Modul 2, referred to as "Coding", covers the conceptual approaches developed in the first module, realizing scenarios and programs into an architectural whole. Modul 2 is the process of maturing the first design ideas and schemes that students put forward in the first modul. In this process, students were expected to rationally organize and describe the architecture, function, form, circulation, and construction issues they will build on their preferred architectural program in the second and third dimensions. Instructors did not give a specific program to students within the studio. Students have created their scenarios and programs in parallel with their research on the user and the location. As a result, different scenarios such as children's library, children's street, children's art centre, children's drama school, children's workshop have emerged.

The effective participation of students in discussions and reviews in the studio has been encouraged to ensure the process can conduct efficiently. The first module primarily formed through collective operation and production, while the second progressed mainly through individual studies. However, studio instructors encouraged students to participate in the discussion and comment on other students' work in all courses. In this respect, the lessons just before and after the juries and juries have prepared a major basis. In this module, a seminar was conducted by G. Lekesiz to investigate children's spaces with examples titled "Design, Research, Learning".

The second module, moving from concept to detail, required simultaneous production at different scales. Many topics have been discussed in this context, from topography, construction, landscaping, to material selection criteria. This program has therefore continued for continuous and exceeding the course hours and almost full participation.

## **4. Evaluation**

At the end of the course, it is important that both students and course instructors make their assessments of the course. These assessments

are even more critical for the future, given that our experience in remote education is very limited. For these reasons, Studio 201 A participants were asked to survey at the end of the semester with questions about the remote studio experience. The survey was produced via Google Forms and passed on to students online.

### **4.1. Questionnaire**

It was aimed to collect quantitative and qualitative data with the questionnaire and the students' perspectives on the studio method to reveal by giving survey statistics. Survey questions which are 25 in total, are grouped under four main topics: a. Remote education, b. Remote education tools, c. Studio components, d. Self-assessment. The answer of 21 multiple choice questions was measured using the linear Likert scale (1 strongly disagree, 5 strongly agree). Quantitative research data was analyzed with Google Forms which the current online survey creation tool.

#### **a. Evaluation of Remote Education Experience**

At the first step of the survey, participants were expected to evaluate their remote education experience. They were asked to express positive and negative aspects of the studio process in items. Students have answered 16 positive and 26 negative items on remote education experiences.

The benefits of the remote studio are as follows, according to students:

##### **— Saving Time**

Students stated that they could use their time more efficiently in the distance education process.

*"We did not waste time for some situations such as printing.", "I spent the time I used to spend on the road, on my project.", "I spent the time I gained by watching my asynchronous lessons at 2x speed, on my project."*

##### **— Getting Feedback**

In the distance education method, it is understood from the statements below that students follow and understand the feedback more efficiently.

*"A chance to see everyone's criticism.", "We had the opportunity to listen to the crits of other friends so that we could see our deficiencies."*

*"Maybe more topics could be covered face to face, but I think feedback was better and more understandably."*

— Also, students pointed that the physical comfort created by the home environment and stated that they improved themselves in the use of technological equipment on this occasion.

*"I think that listening to a lesson in the comfort of home has some bad aspects, but it reduces the fatigue of the previous day to some extent, and it helps to listen to a better lesson.", "I have improved myself a lot in using computer programs."*

According to the students, the compelling aspects of the remote studio are:

— **Lack of Motivation**

The students stated that being away from the campus environment and friends and not being face to face with the instructors caused low motivation.

*"It gives the feeling of doing the lesson just to do it.", "I think it decreases motivation to participate in front of the computer.", "I loosely tried to continue to learn something since there was no tension in meeting them face to face.", "When we were on campus, we were chatting among friends, asking questions, doing this job with a fun and a friend was looking at this, he also was starting to work, but now all is different. How long can we work in a family environment?", "In face-to-face education, we could be more efficient by helping each other with our friends about our shortcomings. This is not possible in distance education."*

— **Difficulty in Effective Communication**

Students stated that they sometimes had difficulty expressing themselves during the studio.

*"There were cases when we had difficulty expressing ourselves on the computer, especially at juries.", "I think that the computer is reduced the efficiency of communication, sometimes incomprehensible points occurred in feedbacks.", "I generally could not answer the teacher while I was getting critics because of worrying about voice confusion, and I could not explain my problem."*

— **Dependence on Technology / Technical Problems**

Problems in the technology tools and technology addiction are other cases that students think that negative.

*"We are dependent on computers and online tools, the internet may be disconnected, the computer may be broken, or everything can be deleted with a click of a button.", "Due to internet malfunctions, my research was constantly interrupted, or I dropped out in the middle of lectures."*

**b. Evaluation of Remote Education Tools**

The Zoom application, which is used as the common communication tool in the studio process, has been evaluated by students. Survey results show that students have had difficulty communicating effectively with their studio instructors via Zoom from time to time (2.18). However, they mostly had no difficulty expressing themselves (3,82) and understanding critics (3,09) (Table 1).

Site analysis, an essential stage in the architectural design studio, was conducted based solely on data collected on the internet due to remote education. Students believe that they have had sufficient knowledge of the Koşuyolu by doing remote research (4.09).

**c. Evaluation of Studio Components**

The course components are classified as open boards, readings, seminars, workshops, and juries. Students have been asked to evaluate each component in terms of their contribution to their project development. Two different workshops, three different seminars, and two juries have been evaluated separately in the process. The questionnaire results show that the students' common opinion is positive ( ). Students also selected workshops as the most helpful component (72,7%) (Figure 10).

*Table 1: Results of the student questionnaire*

	<b>Question</b>	<b>Mean</b>	
<b>Evaluation of the remote education tools</b>	I had difficulty communicating with the instructors via Zoom.	2,18 / 5	
	I had difficulty expressing myself via Zoom.	3,82 / 5	
	I had difficulty understanding the crits taken via Zoom.	3,09 / 5	
	I think that I have enough information about Koşuyolu through research with virtual platforms.	4,09 / 5	
<b>Evaluation of studio components</b>	I think that research on children and space has been useful for developing my project.	4,45 / 5	
	I think that reading on children and space has been useful for developing my project.	4,27 / 5	
	I think that writing on children and space and designing posters on child and space has been useful for developing my project.	4,09 / 5	
	I think that the seminar on "Being a Child" helped me develop my perspective on the subject.	3,45 / 5	
	I think that the open boards we created via Miro contributed to my thought production.	4,55 / 5	
	I think that the first workshop "Playhouse" has been useful for developing my project.	4,36 / 5	
	I think that the second workshop "Adventure World" has been useful for developing my project.	4,36 / 5	
	I think that creating dynamic presentation techniques (gif, video) has been useful for developing my project.	3,92 / 5	
	I think that the seminar on "From Yesterday to Today Koşuyolu" helped me understand and analyze Koşuyolu.	3,73 / 5	
	I think that the seminar on "Design, Research, Learn" helped me learn from project examples.	4,64 / 5	
	I think that the crits I took on the first jury have been useful for developing my project.	4,09 / 5	
	I think that the crits I took on the second jury have been useful for developing my project.	4,36 / 5	
	<b>Self-assessment</b>	I think that I was able to deepen my research through digital platforms.	4,09 / 5
		I think that I am sufficiently contributed to open boards.	4,55 / 5
I listened to my peers' crits.		4,73 / 5	
I had difficulty in distance education in studio 201.		3,91 / 5	
I think that remote education is reduced my efficiency in the scope of studio 201.		3,64 / 5	

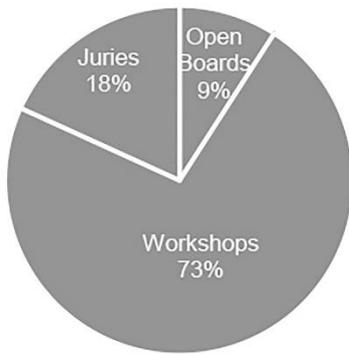


Figure 10: Evaluation of the most helpful component of the studio

#### d. Self-assessment

Students were asked to evaluate themselves for their performance during the studio process in the final phase of the survey. This section revealed that students often listened to the crits of other students (4,73). However, students have stated that they are generally challenged during the remote education process (3.91) (Table 1.).

#### 4.2. Studio Instructors' Overview on Remote Education Experience

Design studios are environments where original architectural patterns are defined by experimenting with ideas and approaches from the ground, discussing the thought base of architecture (Turgut & Açımız İşbakan, 2019). The learning process takes place in the interactive environment of the studio with the interaction between the student-instructor-studio, instead of a linear flow of information from the tutor to the student (Özgüven, Kumsal, Bayram, & Cantürk, 2020). The combination of architecture students with community members, together with the assistants and the instructor, or the director, of the studio, creates an opportunity for a comprehensive learning situation (Salama, 1995). Furthermore, studios have unplanned encounters with students in other groups, their work, and their instructors. The studio's pluralist structure offers these possibilities to create a robust interaction environment.

When creating 201 A's setup, the primary motivation was to create a structure in the virtual environment that could allow similar

interaction opportunities in the physical studio environment. It has been investigated which ways and methods can be used to create this structure. For example, the 'open boards' in which all participants in the studio can be simultaneously involved in production have been beneficial in this sense. In addition to the study carried out during the course -just like in face-to-face education- students were observed to be able to (co)work with the program that was also used except the course hours. Students could not reach the studio/studio production during face-to-face education at any time, but they could reach each other's works any moment during remote education. The LMS system has provided continuous access to all information and documents, announcements, and seminar records throughout the period. We also found that students are willing to add their research to the information pool created and access/use the information added here.

Şentürer (1994) describes the design studio as where the architectural design knowledge and skills are intended to be given to participants. She indicates that communication occurs both in visual and verbal language, and this communication occurs randomly in the studio. It was observed that casual dialogue-based education established in and outside the studio with students decreased in remote education. The reason for that could be physical spaces allow surprises. The fact that the studio (i.e. Zoom meeting) takes place within specific hours in remote education and opens and closes in connection with a button blocked the coincidences. In this context, one of the methods used within the studio is to organize short workshops to accelerate the process. In fact, the two workshops that we conducted within 201 A have beneficial above the expectation (perhaps more than those similar during face-to-face education). Apart from the solution recommendations students developed for the given problem, these short studies have enabled us to recognize 'remote' students and explore their skills, potential, and authentic character. Incorporating different representation formats (such as writing, collage, video) into these studies created a dynamic environment and stimulates students' learning

urges. Almost always went beyond the course hours, although it was clear that most students were actively willing to join the studio.

It is clear that architectural design is not a process to teach but a process to experience. Studios are active places where students are engaged in various activities such as drawing, communication, and model making, socially and intellectually (Dutton, 1987). However, it was not always possible to find the complete response of these activities in remote education. The 201 A is a design studio programed for third-term students. So here, students encountered some problems in the architectural design process for the first time (such as understanding the site's properties). They also lacked scale and architectural representations, and, frankly, they did not make it any easier to draw on a computer all the time. Moreover, the screen added another new layer between the product and the producer. They had never made physical models to allow them to perceive the slope of the field as three-dimensional before. In our experience, perhaps the most challenging topic for students was understanding topographic data and being able to recommend architectural solutions for this data. Because of the pandemic conditions, students did not get a chance to examine the work area on-site. Instead, the properties of the place were tried to be transferred to students with a 'remote' multilayered study (seminars, research, and readings). While the students have expressed that they are not having any problems with this, we think that it has created a significant challenge to understand the place.

Furthermore, most students did not know to create three-dimensional digital models at the beginning of the semester; however, they had to learn quickly. At the end of the semester, most students made significant progress in 2d/3d drawing programs. Some students went beyond that and developed a unique/strong language for themselves. In addition to all this, there were some technological infrastructure problems in the studio from time to time. Remote training requires appropriate hardware and required software, as well as a stable internet connection. In a synchronous course, such disruptions can

significantly affect communication. Especially in juries conducted with two studio groups in parallel (studio 201 B by Işıl Tekçe and studio 201 C conducted by Ebru Karahan), significant problems have been experienced about internet speed from time to time.

## 5. Conclusion

Philips (2020) has matched the fact that departments have been shy about adopting online and remote education models in recent years with factory workers' fear of robots. Human beings are distant from what they do not know and do not easily leave the comfort zone. However, universities/university education has to be open-minded and innovative when it comes to the future. It has to be responsible for developing ideas/products for an inclusive, healthy, safe, fair, and equal future for everyone.

Covid-19 has been an inflictor factor in updating conventional tools in the architectural design studio and allowing technology to be more involved in the studio process, and therefore adapting to our age. Also, many approaches in traditional studio culture have been supported by technology tools rather than a fundamental change and have been survived in the approach of remote education. For example, collaborative studies and group production, which are an essential part of the architecture studio, have been experienced using online tools that enable simultaneous co-production. It has been observed that the production is carried out efficiently with the common participation of the entire studio or with smaller groups. Besides, produced presentation element is one of the main changing phenomena in remote education. Digital products have replaced all kinds of presentation boards, physical models, and sketches, drawings on paper in the traditional studio. Factors such as the limitlessness of the virtual environment, the diversity, and the availability of materials have positively influenced the student's level of representation. The use of different representation techniques has been encouraged in the studio process.



In distance education, the individualization of students' work outside the studio has been effective in developing personal skills such as research, access to information, and time management. On the other hand, it has led to a low motivation of students to work. In the context of learning, architecture education should not be considered just the transfer and acquisition of information. If there is no interaction between actors during this acquisition, it is not possible to mention a real gain in the process (Yurtsever & Polatoğlu, 2020). Therefore, in the 201 A studio, communication channels were kept active, and group concentration and collective information production were kept foregrounds. It was intended to provide dynamism with short-term exercises such as workshops. Also, at the beginning of the process, these applications have been an important step in recognizing students.

Field trips, another major phenomenon of the studio, were performed physically in the traditional studio, while remote training took place in a virtual environment. A project area has been selected in which the site-related data is rich. Students who are unable to experience the site physically, with body movements -also depending on the fact that they are second-year, had difficulty understanding the scale. The virtual experience is not enough to support all perceptions. At this point, students have been encouraged to build three-dimensional models to experience space and support site research with written and verbal resources except for visual resources.

As a result, the components of the studio, such as juries, interaction, collectivity, multilayeredness, dynamism, feedback acquisition, are also present in remote education, supported by technology tools. The fact that architecture education is based on visual production/expressions can facilitate adaptation to remote education. Although there are verbal communication difficulties in the studio conducted with remote training, visual/screen sharing has supported communication throughout the process.

Education, by its nature, requires constant renewal, awareness of the realities of time and makes it possible to think about the future. When it comes to architectural and design education, this responsibility and effort make it imperative to rethink each time in relation to many different branches and make strong internal questioning without obeying habits (Özorhon, 2021). The Covid-19 crisis provides strong motivation to rethink the architecture design studio, architecture education, and even the whole of architecture. We need to look for durable models when designing tomorrow's living environment or designing the education of those who will design tomorrow's living environment. For looking ahead and forward-looking designs, it becomes crucial to reveal what has been left behind / our experiences and to be able to evaluate them from a critical and multi-faceted perspective. When it comes to remote education in the architectural design studio, it can be said that our experiences are very limited. Therefore, sharing/discussing each experience is important for the development of more effective methods. This article has discussed the subject of remote education in the architectural design studio with this perspective. It has revealed the problems and potential of remote education in the architectural design studio through experience.

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# Intuition in the Design Studio: A Perspective on Student's Creativity and Design Process

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**Abstract:** In the twentieth century, as a result of the transition to a scientific approach in design, intuition lost its validity and design became a rational act. In well-defined problems, the design process could be structured with this scientific approach, however, in an ill-defined structure, rationality needs to be combined with intuition to analyzing the design problems, decisions making and generate solutions by supporting the creativity of design students. In this respect, intuition can assist to strengthen and develop the required abilities during the process. Accordingly, the aim is to understand the role of intuition, how students use it to work creatively through sketches, and conceptual ideas, and the problematic process of transformation into architectural knowledge in the design process. The study carried out a literature review to draw an understanding of the dimensions of intuition and its role in the architectural design studio. The results of the study demonstrate that intuition has a crucial role in the design process. Relatedly, the lack of intuition becomes problematic, due to the non-conveyable character that it cannot find a place for itself in the design education in terms of crits from tutors, and alteration of intuition into concrete representations leads to a gap between intuition and the final project. Furthermore, these problems could be eliminated through the coherent use of two features which are rational approach and intuition. In this respect, intuition, creativity, and rationality is needed to perform together in order to achieve success by deciphering the potentials of the project through the process.

**Keywords:** Intuition, creativity, design studio, designing process.

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## 1. Introduction

Until the beginning of the twentieth century, design education followed intuitionism, and intuition was seen as one of the most widely accepted way to design (Orbey & Erdogdu, 2020). Later, with the industrialized production techniques, there was a transition to a new perspective. This perspective is a scientific design process that includes the transition from scientific knowledge-based, "pre-industrial, craft-oriented design to a modern and industrialized design, using a mix of intuitive and non-intuitive design methods" (Cross, 2001, p. 52). Within this shift, intuition lost its validity to the logical positivism from which

rational thought arose. In this notion, design became a rational act itself (Cross, 2001). However, intuition, as a supporter of the analytical mind, can involve in the design process and reclaim its validity and place. While the design is defined as a process, open-ended and ambiguous question, and problem-solving discipline (Goel, 1995) a design studio contains creativity, rational thinking, and practical problem-solving (Robinson, 2001). When it comes to problem-solving, a general design education should be justified in terms of "helping to develop students, able to understand the nature of ill-defined problems, how to tackle them, and how they differ from other kinds of

problems” (Cross, 1982, p. 225). Once the problem is defined, students draw on both the research and their experiential base, applying abstract thinking and imagination through brainstorming to generate a variety of possible solutions. In the brainstorming stage, intuition may lead the way for students and creativity can be thought of like a burst of development (Dorst & Cross, 2001).

In an ill-structured design problem, intuitive consciousness can operate with higher accuracy than conscious reasoning (Frank, O’Reilly & Curran, 2006; Klein, 1998), in terms of strengthening and developing the abilities required to analyze ill-defined design problems and generate solutions. A better understanding of intuition will be an important contribution to understanding the design problem, decision making, and support students’ creativity. This study re-asserts the importance of intuition in a design process to support students’ creativity and problem-solving. The aim is to understand the role of intuition, how students use it to work creatively, and the problematic process of transforming it into architectural knowledge in the design process. This study sets out a review of the literature regarding the dimensions of intuition and its role in the architectural design studio. In the scope of this paper, how students use their intuition in the design process in the sketches, and conceptual idea stage, for creative problem-solving and the lack of turning intuition into architectural knowledge in the design process will be discussed.

Dane et al., (2012) argue that intuition has both positive and negative consequences. On the one hand, it is helpful when a person has a wealth of knowledge of specific to the field. On the other hand, it will lead to negative consequences if the person has only low domain expertise. Accordingly, the role of intuition has changing effect regarding the level of expertise in the working area that a productive intuition only possible by doing more design activities. With balanced usage, intuition may help students for a creative design solution, the choice of knowledge, determining the problems, choosing one of the different alternatives produced, reaching the solution. In contrast,

intuition in the design process may bring some new problems that there are some difficulties in providing rational explanations about turning intuition into architectural knowledge. Sketches and conceptual ideas can be defined as representation modes of intuition and contain creativity but when the idea becomes an architectural project the logical requirements are needed.

The lack of using intuition emerges when students try to formulate their intuitive and creative sketches, and conceptual ideas into a project that engages with the critics from instructors, architectural knowledge, technical requirements of an architectural problem, and representation of the project. This leads to a gap between students’ intuitive design concepts and the final project. As an output of the project, the final design may not appear intuitively. The intuitive and creative lack, and the gap between students’ intuitive design; sketches and conceptual ideas, and the final project still exist in the design process. Suh and Cho (2018) found that while intuitive students demonstrate more creative aspects at the beginning of the design phase, it is observed at the end for more analytical and adaptive students. So, this lack can only be completed with a new design process. This paper suggests a middle ground for a design studio, containing both rational and intuitive, that can be followed to support every stage of the process. In this respect, a project can be successful both technically and conceptually. Accordingly, it may support intuitive rational solutions by emphasizing the design process.

## **2. Intuition**

Intuition may help students in the design process to use creativity as architectural knowledge, develop an understanding of ill-structured design problems, produce alternatives, and reaching the solution. So, what is intuition?

There are many ideas about intuition presented by psychologists, philosophers, and other scholars. Psychological literature examines intuition as an implicit, form of knowledge. It is accepted as a short, instantaneous, and rapid

process of knowing at least unconscious information structures (Bastick, 2003; Polanyi, 1966). In psychology, Daniel Kahneman (2011) defines intuition as an integral part of thinking. Due to the nature of the human brain, every person is intuitive, whether the person is aware or not (Laughlin, 1997). Every person uses intuition in their daily lives constantly. In addition, people's decision-making processes are often based on these intuitive unconscious processes such as associations, habits, memories, and emotions (Glöckner & Wittman, 2010). It is generally regarded as a sudden, flash-like, instantaneous form of knowledge and a solution that provides insight into a problem that enters consciousness in a seemingly unbidden way (Bastick, 2003). For Henri Bergson (1946), the body is the core of perceptions, and intuition is the process of capturing one's self. In this process of self-sympathy, individuals catch themselves from within, and self-sympathy transforms into others in a heterogeneous way (Bergson, 1946). "To ask whether the universe exists only in our thought, or outside of our thought, is to put the problem in terms that are insoluble, even if we suppose them to be intelligible" (Bergson, 1991, p. 25). Raami (2015, p. 58), argues that Bergson's perspective as "intuition is fundamentally unrepresentative, it places us either above or below representations."

"Pure intuition, external or internal, is that of an undivided continuity. We break up this continuity into elements laid side by side, which correspond in one case to distinct words, in the other to independent objects. But just because we have thus broken the unity of our original intuition, we feel obliged to establish between the severed term a bond which can only then be external and superadded" (Bergson, 1991, p. 183).

In addition to Bergson, phenomenological philosopher Maurice Merleau-Ponty (1962) also mentions the role of the body as the center of perception. While Bergson states that the reality of things cannot be constructed or reconstructed Merleau-Ponty claims that perception is a subjective synthesis and experience is reconstructed (Bergson, 1991;

Merleau-Ponty, 1962; Raami, 2015). In social sciences, intuition is defined in connection with tacit knowledge by Polanyi (1966). Knowing here shows that "we can know more than we can tell" (Polanyi, 1966, p. 4). According to Polanyi (1966), even the knowledge itself is based on a tacit dimension. He also states that people are often unaware that they have tacit knowledge or may be valuable to others. Even if they are aware, tacit knowledge is difficult to be expressed it in writing and verbally. Polanyi (1966) describes intuition as awareness that illuminates the gap between tacit knowledge and focused knowledge. While focused knowledge is explained as explicit knowledge, defining what the person is dealing with, tacit knowledge described as the basic part of processing data (Polanyi, 1966). Tacit knowledge is the visible part of an expert's knowledge, know-how. Tacit knowledge and intuition are important in decision making, problem-solving. They can allow recognizing a problem and create a solution. As an example, many decision-makers mentioned having "an immense instinctive feel", "a high quality of understanding", and "an intuitive sense of the business" (Eisenhardt, 1999). From Faculty of Arts and Education, Tony Bastick (2003) defines intuition as (1) contrast with abstract reasoning, logic, or analytic thought, (2) sense of relations, (3) recentering, (4) influenced by experience, (5) emotional involvement.

Donald Officer (2005, p. 7) defines a summary of the sources of intuition as "(1) Intuitive knowledge may be self-explanatory, but not accessible or verifiable by an external reference. (2) Intuition is thought of as a tool that links creativity to practical results. (3) Intuition is synonymous with tacit knowledge: the essential but unexpressed knowledge needed to execute intricate tasks or skills. (4) Intuition may be associated with magic, the paranormal or the unconscious depending upon one's understanding of knowledge and reality."

According to Nuray Sungur (1992) the situations where intuitive methods are most useful are as follows (1) when there is a high level of uncertainty, (2) when there are very few clues about the situation, (3) when data are not

sufficient for scientific predictions, (4) when previous facts about the problem are limited, (5) when the data start to decrease and new indicators start to emerge, (6) when numerous solution proposals arise, each with strong bases, (7) when it is necessary to make the right decisions in a short time.

### **3. The Link between Intuition and Creativity**

Henri Bergson (1946) believed that the most accurate form of knowing can only be achieved by intuitive actions, as he believed that the intuitive state had a direct connection with reality itself. Bergson (1946, p. 32) describes the state of creative consciousness as “immediate consciousness, a vision which is scarcely distinguishable from the object seen, a knowledge which is in contact and even coincidence”, it is consciousness extended. For Bergson (1946), intuition is a function of the human mind that grasps the interpenetration of experience through this immediate consciousness.

The role of intuition is accepted in various fields. In the field of psychology, Boden (1994) says that the role of the mind’s unconscious ability is profound in all creative processes, and intuition is seen by Bastick (2003) as the first and necessary stage of creativity. In the research in art and science, Weston Agor (1989) argued that intuition plays an important role in the creation and development of new ideas. In studies on innovations and problem solving, Root-Bernstein and Root-Bernstein (2003), emphasize that the act of creating comes from intuition. Paula Thomson (2006, p. 217) argued that “people who score high on intuition in psychological tests also tend to score high on creativity and divergent thinking.” Many designers have also emphasized the importance of intuition in the creation process. (Mäkelä & Numkulrat, 2011; Seitamaa-Hakkarainen et al., 2013). Intuition can be seen as a meaningful part of the creative design process. According to Durling, Cross and Johnson (1996, p. 6), “Designers’ creativity seems inextricably bound up with their particular personality types. Intuition seems to be at the core of the designers’ special brand of creativity.”

### **4. The role of Intuition in the Design Process**

Design is generally defined as a process, open-ended and ambiguous question, and problem-solving discipline (Goel, 1995). The design process is considered one of the most challenging cognitive tasks as it requires the multidimensional use of cognitive skills. The design process is infinite, each problem is a symptom of another problem, and each solution often leads to a new problem. It is difficult to know which components a problem is related to and what information will be useful for a solution (Lawson, 1997). In the literature, the type of the design problem is defined as ill-defined (Archer, 1979), ill-structured (Simon, 1973), or wicked (Rittel & Webber, 1973). Friedman (2003, p. 508) states that most design definitions have three features in common “(1) design is a process, (2) this process is goal-oriented, and (3) the purpose of design is solving problems, meeting needs, improving situations, or creating something new or useful.” Due to its open-ended and ambiguous structure, there is no true, certain or single approach, methodology, result, or formula to follow for defining and solving these problems. A design process can change depending on the conditions of the studio environment, student, and design parameters. Design problems are full of uncertainties. This ambiguous nature of the design problem allows richness and creative solutions; they typically include conflicting assumptions and information that may lead to different solutions (Reiter-Palmon et al., 1997). Therefore, it is possible to define each design process as ‘unique’. Non-routine design problems cannot be completely solved by routine problem-solving processes, different and potentially creative ideas and unpredictable solutions need to be generated (Rittel & Webber, 1984). While well-defined problems can easily be solved with the help of systematic approaches, ill-defined problems can be solved by thinking in a designerly way.

Intuition, intertwined with tacit knowledge, experiences, memories, and implicit thoughts, seen as the apprenticeship in learning how to think in designerly ways that produce the deep insights which designers characteristically manifest (Durling, 1999). In a design problem,

architects tend to focus on the solution and adjust the creation of their own (Lawson, 1997). A solution cannot be considered without its subject of the design, the design and the designer cannot be considered isolated of their emotions and intuitions. Architects base their choices or decisions on experiences and intuitions (Hogarth, 2001; Pedigo, 2005). Once the problem is defined, students draw on both the research and their individual experiential base, applying abstract thinking and imagination through brainstorming to generate a variety of possible solutions. In the brainstorming stage, intuition may lead the way for students and creativity can be thought of like a burst of development (Dorst & Cross, 2001). In an ill-structured design problem, the analytical mind may overwhelm with too many options and fail to reach a solution when there is a lack of information or cannot imagine options beyond imagination. Intuition can assist to strengthen and develop the abilities required to analyze ill-defined design problems and generate non-routine solutions. As Shapiro and Spence (1997) note, intuition often bears a more important role than analysis to have a comprehensive perspective through a complex system's structure.

Dane and Pratt (2007, p. 45) claim that "intuition, as a holistically associative process, may help to integrate the disparate elements of an ill-defined problem into a coherent perception of how to proceed." Intuition may infuse throughout the process, which starts with defining the goals and objectives of the challenge and designing a plan to structure, enable individuals to develop an understanding of ill-structured design problems and, direct problem-solving. Design can be a skill created by the person using their full capacity. Besides the analytical mind and explicit knowledge, intuition intertwined with experiences, memories, tacit knowledge, and implicit thought could also be an important part of the design. As "we can know more than we can tell" (Polanyi, 1966, p. 4), we can also design more than we can learn. In designing a project there is an experience of having the idea and knowing it is right. Mehran Kheirollahi (2012, p. 58) stated that "many designers express the attempt

to determine the process of designing as a struggle to recognize an inner sense whose result is not generally defined or recommended."

While MacKinnon (1962) defines designers as "intuitive", Durling, Cross, and Johnson (1996, p. 1) mentioned that "designers' strategies for problem-solving are different from many other professionals, and an intuitive way of working is preferred strongly." Krik Hamilton (2019) mentions that architects often come to design decisions based on their intuition and personal experience. As an example, designer Ken Yeang states "I trust the gut feeling, the intuitive hand, the intuitive feel about the project . . . you can technically solve accommodation problems, you can solve problems of view and so on but which problem to solve first is a gut feeling . . . you can't explain it, but you feel that's right and nine times out of ten you are right" (Lawson, 2005, p. 203). Moreover, the psychological studies held in Royal Designers for Industry demonstrate that intuition has importance while deciding the right idea (Csordas, 1994). Durling et al., (1996, p. 5) also show that "over three quarters of representative design students have a preference for intuition (79%) and a majority also prefer perception." Linzey (2001) states that architects, like scientists, are trained to be intuitive; they are encouraged to develop penetrating powers of observation, to see relations between things that other people are inclined to overlook. These studies were remarkable observations linking architects to intuition.

The experiences of designers show that intuition is an important tool of creative design solutions to ill-structured and complex problems. Pedigo (2005, p. 16) stated that "one goal of education should be to teach when people should use specific forms of deliberate thought." In a design process, students begin with sketches, conceptual ideas and take a path towards the final project. Robin Hogarth (2001) identifies the skills demonstrated by intuitively as (1) Contrast with abstract reasoning, logic, or analytic thought, (2) ability to accept and learn from emotions (3) desire to speculate and consider alternatives, (4) constant testing of

perceptions, emotions, and speculation. And these skills are used in architecture such as sketches, 2D, and 3D visualization, sensitivity to experience, approach design tasks with alternative solutions.

#### **a. Sketches in the Design Process**

Mike Linzey (2001) states that architects' intuition is engaged in the act of drawing. Chris van Uffelen (2013, fourth cover) notes that "despite the nearly unending possibilities of computer-based methods, drawings and sketches remain the most intuitive expression method of architects." According to Uffelen (2013, description), "beyond the pure conveying of information through a mechanical drawing, the various techniques of manual drawing can convey individual sentiments and impressions." Architectural drawings that an architect makes in the process of designing are the records of relations between components and the stages of an evolving design (Linzey, 2001). Goel (1995) describes sketches as the tools used for creative alterations in design. In the design process, the role of sketches is described as the "primary nucleus" by Arnheim (1993, p. 16). Tate (2007, p. 71) mentions that the creative process "...consists of cyclical loops of feeling, responding, evaluating, selecting and communicating." Sketches have great importance in such a process because, during sketching, emotions and intuitions create some images in students' minds, and they can respond to certain design situations using them. Students can communicate about the design subject with the help of sketches. Sketches are self-communication tools that make designers' inner world much clearer and understandable even for them. This self-communication is defined by Goldschmidt (1991, p. 123) as "dialectics of sketching" and by Smith (2005, p. 2) as "personal dialogue." This dialogue has the potential to lead students to a new emotion, a new design idea according to their intuitions.

Unwin (2007, p. 105) remarks that "For Le Corbusier, sketching was a personal way gradually understanding more and more what he could do with architecture." From these points of view, it is clear that sketches play a very important role as a creative problem-

solving tool in design studios. (Ledewitz, 1985). At the beginning of a design process, sketches are generally tentative, generic, and vague, as a positive quality. As Goel (1995, p. 193) points out, "ambiguity is important because one does not want to crystallize ideas too early and freeze design development." This vagueness helps designers to realize new opportunities (Arnheim, 1993). In this respect, the ambiguity of the sketches helps students to see new opportunities, brings positive developments, transformations, and acts according to their intuitions. In a design studio, students also use sketches as their graphic vocabulary, which play an important role in design thinking and affect how they understand and solve problems. It enables students to represent the design concept by drawing symbols and abstract forms and shows the functional and spatial relationships intuitively. Goldschmidt (1994) draws attention to how the act of sketching externalizes thought and leads to new ideas in his work on sketching. It helps him to create an image in his mind through making and perception. The resulting image can lead to the development of a conceptual design idea.

#### **b. Conceptual Idea in the Design Process**

Within the framework of conceptualization, sketches are defined as effective tools for containing intuition and creativity in design studios. Sketches lead the way to students, in project development, analysis, and find a conceptual idea. Linzey (2001) defines conceptual thinking as a kind of intuition in which the intuited object is an idea. They emerge as a visible image of the design process. It allows students to present potential ideas and solutions during the design process, along with recording new ideas and evaluating the design ideas (Soliman, 2017). When analyzing a design process, it can be seen that the initial stage of the process could be the key point in terms of the formation of the conceptual idea. According to Önal and Turgut (2017, p. 184), "the conceptual design process consists of creativity, which is a cognitive and social process that involves the generation of new ideas or concepts and new associations between existing ideas or concepts." The conceptual idea



is the initial step of the design process where the design idea externalizes by abstract representations. In the conceptual design phase, sketches help students enter into formal and functional reasoning to visualize the spatial arrangements of forms and provide alternatives to solve the design problem. This phase is implemented through a variety of strategies, using diagrams, charts, graphs, interviews, surveys, and experiments to evaluate the design idea. They help students to transform their intuitions and the meaning of verbal expressions and turn them into a graphic context that helps solve design problems (Do & Gross, 2001). It is argued by Do and Gross (2001) that, sketches and conceptual ideas are not only confined to provide convenience in resolving a problem but also play a central role as “the designer’s principal means of thinking” (Herbert 1993), along with interacting with the drawings. Sketches and conceptual ideas in a design studio can be defined as an abstract representation of intuition. They are the act of design, where emotion, creativity, and intuition are embodied with representation. Due to the fact that conceptual ideas and sketches are ambiguous and open to diverse interpretations, they may consider as the most creative phase of the design. When analyzing the whole design process from beginning to end, it can be seen that the initial stage of the process could be the key point in terms of the formation of the conceptual idea creatively according to students’ intuition but transforming that conceptual idea into an architectural language, to a final project contains some problems.

### **5.The Lack of Using Intuition in the Design Process and Outcomes**

In literature, some people define intuition as the only way to create a unique design, while others are skeptical about the usefulness of intuition. Some scholars define intuition as an aspect of decision-making and believe it will lead the designer to be more critical about their work (Badke-Schaub & Eris, 2014), on the contrary, others argued that intuition can be a dangerous tool for novice designers who lack experience (Badke-Schaub & Eris, 2014; Goldschmidt 2014). In a similar way, Dane et al., (2012) state that intuition is helpful when the person

possesses a rich body of domain-specific knowledge; however, intuition will lead to negative results in case the person has got only low domain expertise. Patricia Benner (2001) explains that “intuition and associated high-level performance come after deep immersion in the field, extensive experience, and is reflective of mastery.” Therefore, productive intuition should be considered as a tool of the experienced master designer rather than the novice. Successful use of intuition in the design process is possible by doing more and more design activities. With successful usage, intuition may help students for a creative design solution, the choice of knowledge, determining the problems, choosing one of the different alternatives produced, reaching the solution.

In contrast, intuition in the design process brings with it some problems. The design studio is defined as a complex teaching environment in terms of, “inherent conditions of inexpressibility”, “vague purposes”, and “the ambiguity of implicit theories.” (Schön, 1981) Similar to the structure of these three, intuition: the unconscious, implicit, non-linguistic levels of the mind; sketches: tentative, generic, and vague; and conceptual ideas: abstract representations. In the design environment, this ambiguity, the difference between implicit and explicit messages, may lead to a misunderstanding between students, their intuitions, and instructors. In the early stages of design, students need feedback to enhance themselves, solve the design problem, and make sure they are on the right track. Instructors are involved throughout the whole process by providing critics to improve the students’ work (Oh et al., 2013; Utaberta et al., 2010; 2013). In between critics, students try to integrate their conceptual ideas, sketches, and all their data into a single concrete final project, along with the critiques they receive from their instructors. This stage may define as one of the biggest challenges of the design process for students.

As Badke-Schaub and Eris (2014, p. 367) mentioned, “intuition can lead to decisions but does not the designer how to implement them.” It may become difficult for students to implement their conceptual ideas into a physical

model. Because of the implicit structure of the design studio, it is difficult to analyze the data and reflect the conceptual idea according to both their intuition and critics from instructors into the project in a comprehensible way. In the design process, there are some difficulties in providing rational explanations about turning intuition into architectural knowledge. During this phase, architectural representation of an idea, intuition, tacit and abstract knowledge should transform into concrete and tangible knowledge with the use of physical models, technical drawings, and renders. Sketches and conceptual ideas consist of intuition and creativity but when the idea should become an architectural project the logical requirement occurs. In this respect, the logical requirement that arises for the concretization of the design idea may begin to hamper the creative potential of intuition. In this phase, with the inclusion of drawings, programs, diagrams, site plans, plans, elevations, sections, details (Hurst, 2000) students concretize their sketches and conceptual ideas to set an architectural language. The lack of using intuition emerges when students try to formulate their intuitive and creative sketches and conceptual ideas into a project that engages with the critics from instructors, architectural knowledge, technical requirements of an architectural problem, and representation of the project.

As a result of that lack, when students could not translate their conceptual ideas into their design phase intuitively, they could leave and forget their ideas and start a completely different process focused on a mass design and instructors' critics without applying previous conceptual design ideas. They can focus on a project based on a concrete mass design ruled by critics. Instructors, implicitly, may impose their attitudes about design (Ledewitz, 1985). Most of the students may choose to modify their designs to follow the instructors' feedback instead of intuitions. They focus on examples given by the instructors or projects that instructors like. Being close to the instructors' perspective or personal aesthetic preferences may make students feel safe. However, projects *liked* by teachers begin to attract attention and this could turn out to be detrimental to the

studio. The student's main argument may become *success* rather than *design*. Here, students limit their discussion to design within the instructors' critics, architectural and technical information. In that stage, the crystallization of ideas or freeze design development can be seen in the design studio. This allows concerns to dominate creativity, intuitive design, and the richness of the studio. Ledewitz (1985) states that any students' final presentations are disappointing because the physical form consequences of their design intentions have not been explored. This leads to a gap between students' intuitive design concepts and the final project. "A highly attuned sense of intuition in design does not necessarily lead to intuitive design outcomes" (Faste, 2017, p. 3). As a final project, the final design may not appear intuitively.

The intuitional and creative lack, and the gap between students' intuitive design; sketches and conceptual ideas, and the final project still exist in the design process. This might indicate that some designers are more aware of the role intuition plays in conceptual design thinking (Badke-Schaub & Eris, 2014). This lack can only be completed with a new design process. Suh and Cho (2018) found that while intuitive students demonstrate more creative aspects at the beginning of the design phase, it is observed at the end for more analytical and adaptive students. Just as there is no true, certain, or single result or a formula to follow in design, there is also no certain way to design learning. In the design studio, a middle approach, containing both rational and intuitional, can be followed to support every stage of the process.

## **6. Conclusion**

In this study, the importance of intuition and the lack of its usage in the design process are discussed. Intuition has been defined as an important aspect of decision-making in a variety of domains. This paper focused on the role of intuition in the design studio and argued that the implementation of intuition as a final project is a problematic aspect because the tendency to rational design process causes a strong decrease in the use of intuition in the design process. However, intuition strengthens

creativity in stages of design as a design problem, problem-solving, decision making by expanding the awareness for any potentiality. However, in order to make it visible, it is needed to be transformed into a concrete presentation, which is the main problem faced by architectural students. Although this difficulty could be overcome with more experience, as a student who is at the beginning of the design discipline, the transformation of intuition into architectural knowledge is an area that requires more attention and work. Accordingly, while students deal with the problems executed in the crits or technical requirements of an architectural problem, easily leave their intuitive aspects. Although, they try to focus on it, especially at the conceptual idea through sketches, the lack of intuition is observed.

Intuition should be used throughout the entire design process and become supportive of analytical thinking. In this respect, a design can be successful both technically and conceptually. The more knowledge and skills students acquire, the more they will be able to use their intuition to guide them through the process. "Knowledge comes not from an assimilation of external information, but wholly from an internal dialogue between the individual and his inner self" (Balfour, 1981, p. 797). In conclusion, design education needs to support students in evaluating the pros and cons of using intuition in the design process. This study suggests a new design process, a middle ground, including many possible relations and meanings that can be defined by intuition and rationality. Accordingly, it may support intuitive rational solutions by an emphasis on observing design projects as a process that seeks an appropriate balance between intuition and rationality. Intuition, creativity, and rationality must all work together by completing each other and creating the strongest potential for the success of the project.

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# Going Digital in Design Education: Restructuring the Emotional Bonds in the Online Studio

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**Abstract:** Higher education has experienced momentous changes in 2020-21 due to the COVID-19 restrictions disrupting face-to-face education. An immediate shift to online education that draws on diverse digital platforms and interfaces took place worldwide. This study aims to present insights into this transition process from the perspective of place attachment and sense of belonging with a focus on the design studio, and it specifically looks at the transition to online education carried out by the Faculty of Arts, Design, and Architecture (FADA) at MEF University. The study draws on semi-structured interviews conducted with students from the faculty. Responses from the students indicate that they have felt the effects of the transition process in social relationships, time-space routines, safe space, and changes in their perceptions of personal space. Recent research has demonstrated that sense of belonging and place attachment in educational environments positively affect students' academic performance. The data obtained through this study reiterates the significance of these bonds in the design studio context. The discussion introduces a fresh insight into exploring these critical concepts by focusing on the now burgeoning field of online design education.

**Keywords:** Digital learning environments, design education, design studio, online education, place attachment, sense of belonging

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## 1. Introduction

Education has been one of the most significantly affected fields by the pandemic during 2020. Within the scope of the measures taken, face-to-face education processes were suspended in schools all over the world, and online education began to be applied widely through digital platforms. Architecture and design schools have been considerably affected by the relocation process due to the unique nature of the pedagogical approaches of their curriculums. The transition to online education was remarkably sudden and in all facets of design education, including but not confined to

design studio, theory courses, and visual communication. All of the courses needed to be immediately adapted to digital platforms.

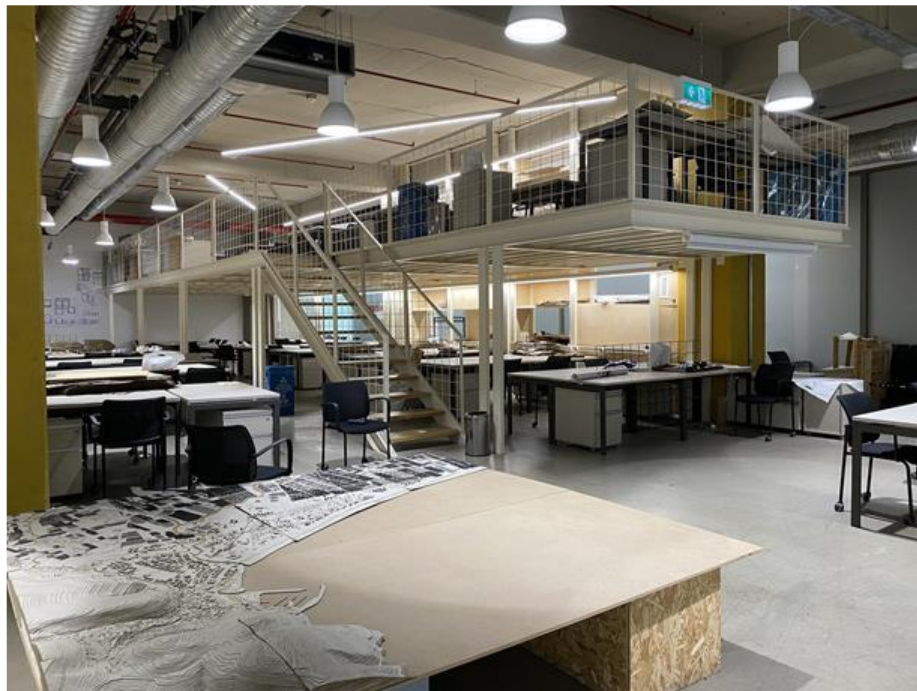
The immediate transition of education to digital platforms, on the other hand, raised some questions about students' relationships with educational institutions and the field of design. This study aims to explore this transition process from a perspective of "belongingness" and "attachment" to the studio environment, based on the acceptance that the design studio is one of the development areas of spatial belonging. The online education experience at MEF University Faculty of Art, Design, and

Architecture (FADA) is examined as a case study.

As indicated in research findings [France, et al. 2010; Freeman, 2007], the design studio environment provides a fertile ground for building diverse and multi-level social relationships. Thus, it has a significant potential to support academic achievement by enhancing spatial belonging and place attachment. Design studios reflect a common culture that transcends the boundaries of different design traditions. In the FADA studio, which is the subject of the study, learning processes are intertwined with various social environments in the studio, and the place is used as a collective design area besides accommodating the project courses. The studio encourages students' learning experiences by providing space for different learning modes such as workshops, design-build experiments, and seminar programs.

Like in many studio-oriented design schools, the design studio lies at the core of the education at FADA. The curriculum revolves around the studio work, and the culture of the faculty draws

considerably on the character of its open-plan studio environment named Hangar (Fig.1). Students of both programs come together in this area for design studios, some of the theoretical courses, hands-on practices, collaborative productions, informal meetings, seminars, and various studio activities (Fig.2). The studio constitutes a vibrant environment that is twenty-four hours open and accessible throughout the school year. The open layout plan and mixed profile of students enable students to follow each other's design works through casual talks and socializing as well as discussion forums, exhibitions, regularly held reviews, and design juries. All the students are provided with private desks and storage cabinets for their tools and other belongings, which enables and leads to highly personalized individual work spots in the open plan layout of the studio. As a result, the design studio corresponds to an accessible, interactive, and intensive learning environment for the students where they spend a considerable amount of time and even choose to stay in during some nights to work on their design projects during some periods.



*Figure 1: View from Hangar, the design studio used by Faculty of Arts, Design and Architecture (FADA) at MEF University (Source: Burcu Baloglu Year: 2020)*





*Figure 2: Students discussing on sketches they have produced during a visual communication course session (Source: Burcu Baloglu Year: 2020)*

## **2. Place Attachment, Sense of Belonging and Learning Environments**

The concepts of place attachment and sense of belonging have been subjects of studies in different fields such as environmental psychology, sociology, and architecture. Although there is a diversity in the definitions of place attachment in literature, the explanations of the term revolve around the affective links, emotional bonds, and interactions between people and places. When individuals stay in a place for a long time, they tend to develop a sense of belonging to that place. Research demonstrates that attachment has often been approached as a multi-dimensional concept that includes person, place, and psychological process dimensions. The psychological processes can be formed as affective, behavioral, and cognitive bonds between individuals and their meaningful environments [Chow and Healey, 2008; Hidalgo and Hernandez, 2001; Scannell and Gifford, 2010]. These emotional links are often associated with having positive feelings about a place [Lewicka, 2010]. The affective dimension of place attachment is related to the emotional connection that a person has toward a place that

includes liking and feeling happy in that environment [Scannell and Gifford, 2010] and having a sense of belonging or connectedness [Gustafson, 2009]. Studies indicate that people tend to develop affective bonds with places that permit control, foster creativity, and provide privacy, safety, security, and serenity [Altman and Low, 1992; Chow and Healey, 2008]. Another dimension of attachment occurs in the behavioral level, in which individuals express their attachment through staying in a particular place and proximity-maintaining behaviors [Scannell and Gifford, 2010]. Accordingly, they desire to remain close to a place for long periods and relocate to similar places. The third aspect of attachment, the cognitive dimension, includes the memories and the meaning associated with the place [Scannell and Gifford, 2010].

Much of the relevant literature about place attachment focuses on understanding the bonds with residence and the immediate communities such as home, neighborhoods, or countries. However, there is also a growing number of recent studies searching for the experiences in other places and their meanings for people.

Lewicka [2011] mentions that the critical requirement to investigate an environment from a place attachment perspective is the place's being meaningful for an individual or a group of people. Accordingly, the concept of attachment can be applied to different types of environments varying in terms of type and scale, such as working environments, football grounds, sacred sites, or even virtual and imaginative spaces [Lewicka, 2010]. Recent studies show that there has also been a growing interest in place attachment and its implications in educational settings. The university environments need to be addressed from this viewpoint, considering that students spend at least four years of their lives in these spaces.

Place attachment studies related to learning environments indicate that attachment is a significant component of positive academic motivations and outcomes [Bergin and Bergin, 2009; Freeman, Anderman and Jensen, 2007; Li, 2012], and sense of belonging is an essential concept in educational settings which contributes to the motivation of students and engages them in learning [Li, et al. 2013; Osterman, 2000]. Moreover, environments that enhance positive emotional states are expected to facilitate learning and the development of place attachment [Graetz, 2006]. Osterman [2000] discusses that students experience school as a community that they need to feel belonged, related, or as a part of the group, and asserts that the social context in the educational setting plays a significant role in developing these bonds. There are also studies adding support to the argument that having more social contacts with people in the university may relate to more substantial development of attachment to the school [Li, et al. 2013]. There are also burgeoning sub-field of studies that address the place attachment concept in digital or virtual environments. Arora and Khazanchi [2014], for example, touch upon the discussion from a social perspective. The authors [Arora and Khazanchi, 2014] suggest that in virtual learning environments, collaborative works that involve interactions among a group of students who manipulate or work on the same task together, the social sub-component of place attachment gets improved as it also happens in

physical environments. It can be inferred from the sources mentioned related to the subject that it is possible to construct multi-layered forms of sense of belonging to the place in educational environments such as design studios that allow the establishment of various social relationships. As a physical, cultural, and social place, the design studio constitutes an area in which complex interactions of place attachment with the learning processes can be explored.

### **3. Capturing students' insights about the transitional process from the studio to the digital platform**

In March 2020, the preventive measures to slow the spread of the pandemic brought about an interruption of face-to-face education for a long time in schools and higher education institutions. An immediate adjustment period to the new situation started, and educational practices were moved to online learning platforms in most universities, including MEF University. Studio sessions were conducted online throughout the following year due to the obligatory shift to adapt to the "new normal" situation. The loss of the physical environment has come up with its constraints; on the other hand, this change led to revealing potentials in alternative ways of sharing knowledge. Moreover, the situation created an interest in searching for how the students internalize this loss and discuss how some intangible factors that affect studio experience, including the sense of belonging and place attachment, were redefined in the new digital environment.

A qualitative study was conducted to explore the students' thoughts about the transition process they have experienced in FADA. The inferences were drawn on semi-structured interviews conducted in Turkish with each of the twenty third-year and fourth-year design students from the faculty. The students who contributed to the interviews have spent at least two years in the design studio, and they were involved in diverse kinds of activities performed in this environment. Interviewees participated voluntarily after responding to an open call in an email from the authors to the third and fourth year students at the faculty. Interviews took place in February and March

2021 at Zoom and through emails when necessary.

Five open-ended questions in the interviews explored students' depictions of the design studio, how they socially relate themselves to the physical environment, and how their working routines were affected during the relocation process. When necessary, follow up questions were asked to clarify the wordings. The overall interview aimed to dive into the narrative descriptions to reveal intertwining attachments with the studio setting and pinpoint emotional bonds. The study concentrated on certain themes that were deduced from recurrent terms and concepts stated by the students during the interviews. Changes in social relationships and working habits and thoughts about privacy in the digital environment were these highlighted themes in students' responses, directly or indirectly affecting spatial belonging and place attachment dynamics.

#### **4. Place attachment by social dynamics in design studio**

The transition process from face-to-face to screen-to-screen learning in the digital environment has also created challenges related to social relations with peers and instructors. Students experienced the multi-faceted change in these social dynamics and the outcomes of the absence of the physical space design immediately with the launch of online education. The absence of an interactive environment that supports the informal learning process after course hours have to be substituted in an online learning environment. Students' descriptions of Hangar during the interviews showed that in the conventional situation they perceive the studio environment as a supporting, warm, accessible, inspiring, and comfortable "space for living," enhancing collaborative design works, gatherings for lectures, and individual studies. The positive attributes that students chose to talk about while defining the space such as warmth, respectful interactions between instructor and students, cooperative interactions among students can be associated with the items approached as

indicators related to school attachment [Freeman, 2007]. Responses of FADA students to the questions of "How would you define Hangar? and What does Hangar mean to you as a space for studying and socialization?" highlights the significance of social interaction for them.

It is not just a studio space for studying, but it is a space for living together for both architecture and interior design students, where they can spend time with each other and the instructors (4th-year student)

Hangar has a warm and friendly atmosphere. It is a very comfortable working environment where you can study without distractions. (3rd-year student)

I think Hangar is inspiring as a studio space, and I believe it provides an area where we can socially cooperate and support each other's motivation to work. (4th-year student)

Responses frequently mention the phrases of "togetherness" and "being together" that are significant components of sense of belonging and attachment. In these terms, it is possible to talk about a unique, shared culture that has been developed in the studio. All these responses reveal the interaction among the students and studio instructors and highlight the significance of the social culture at the design studio from the students' point of view.

In general, I see Hangar as a field of cooperation and socialization. More specifically, I can say that it is a space where we can exchange ideas and find solutions to our problems. (3rd-year student)

Hangar is a well-equipped environment where we help each other with our professors and our friends regardless of our level of class. We can easily reach the instructors without looking for them everywhere. Its open plan allows us to see the works of other students and share opinions. We don't feel confined or surrounded by walls in this space. It is an

interactive and warm environment where we can spend our time during the whole night by studying and drinking coffee with our classmates. (3rd-year student).

In Hangar we can quickly fulfill our needs, easily reach the instructors, and get motivated to study. It is a highly social and encouraging environment where we can spend time with our friends after the formal course hours and work together. (4th-year student)

Some of the students emphasized Hangar's being a special place that is only open to FADA students' access as a characterizing attribute. This viewpoint can also be interpreted as related to their social identification with a particular group, in this case, faculty of design students and instructors to whom they develop a kind of belonging. This is in fact a highly significant outcome of learning in the physical studio. As Yanar [2000] underlines, students learn not only how to design but also how to become a member of its professional community. The concept of "social space" in FADA students' responses includes studio, goes beyond it, and demonstrates students' recognition of the topic.

Hangar is a space for living that is only accessible to the students of FADA. I think the Hangar intensifies our learning experience because we have the opportunity to spend 24 hours in an open space with all the other students. The open-plan actually provides us many options. We have the chance to follow and observe other students' works very easily. Moreover, we always have the right to access the lectures for other studio groups when they invite a guest lecturer. So, for me, Hangar is more like a social area which also accommodates the design studio. (4th-year student)

At the faculty this study focused on, the transition to online education was managed without a major shortfall in terms of technological infrastructure. Nonetheless, students lost access to the physical design studio and were confined to their private living

environments. Subsequently, intangible social aspects that are intertwined with the studio's physical environment and created by various factors such as social interaction and informal gatherings were lost. As recognized by the faculty, these social attributes of the design studio significantly affect the academic motivation. Alternative digital activities and online meeting rooms for informal or education related communication were formed to compensate for missing communication and interaction traits.

In the interviews, questions of "After the transition to online education, Has your way of working for the design studio changed? If yes, What kind of change has taken place?" were asked to the students. Comments by the students demonstrate that despite the opportunities of online social interaction, it is challenging to replicate the atmosphere of the physical design studio. One of the foremost challenges cited by the student is the emotional tension that is caused by the curtailment of the daily interaction with peers and being detached from the routines of the design studio while working alone at home.

My working environment at home is not like at school, making me feel involuntary to work. It is not easy to chat and share information about the project with my friends or ask each other questions during the online studio. So, I often get stuck in even a simple problem just because I feel confused about it. Also, I think one of the most important differences between online and school education is that it is less disciplined, and I use my time inefficiently when I work alone at home. (4th-year student)

Some students even commented that they have tried to meet with their friends in the partially accessible, almost totally empty design studio, and attend their online lessons together. They mentioned that they are much more motivated for studio sessions when they are together with their friends in the atmosphere of the design studio.

[...] I just can't believe I've missed this place so much! Before the shutdown, I was complaining about spending so much time sitting on these chairs. After working at home alone for a long time, I now understand that the studio creates a social, collaborative, and creative environment for us. And for now, it is even better because only a few people are coming to Hangar to study, so this huge space all belongs to us! (3rd-year student)

Comments by the students emphasize the sense of belonging and place attachment formed by the social interaction in the design studio. It demonstrates that the studio environment has considerable significance for their academic motivation. Students have the opportunity to position themselves in relation to their peers, their achievements in their studies, and professional life while becoming part of the interactive network of the design studio. However, interactions and spontaneous encounters are limited in the online environment.

### **5. Privacy and safe space within online design studio**

FADA students considered the role of the design studio as a safe space for social interaction and as an equalizer of social and economic inequalities. In the interviews, they recognized the negotiation of privacy dimensions and the culture of social interaction in the physical studio space. The students' comments may be seen both from the lenses of social relations and privacy dimensions. During the online courses, sharing their desktop screens which allowed all their friends and instructors to glimpse into their home and rooms, indeed became an invasive situation for some students. Besides the privacy dimension, the physical environment's ability to impose equality in various terms, to remove the barriers in student-instructor relationships, and to provide a space where students feel "safe" for being able to be an equal part of the community regardless of their backgrounds seems to be a significant attribute emphasized in the comments.

[...] students can create their own private spaces within the frame of respect to peers. Unlike in other parts of the university, there is opportunity to communicate and cooperate regardless of age, class, and culture thanks to the flexible environment. In my opinion, sharing the same space creates the environment where everyone feels equal. This enables communication and reaching out to people.

Students' emphasis on the "sharp boundaries" and their exclusion of the design studio from this statement reflected their awareness about the studio as an inclusive space. The commentary by FADA students about the role of the design studio underlines the design studio as an equalizer among "students from various years of study," "students and instructors," and students from different socio-economic backgrounds. Chow and Healey [2008] assert that the design studio provides a peaceful personal working space free from dysfunctional social environments and reliable technical infrastructure for students from a disadvantaged economic status. Privacy, safety, and serenity are the qualities provided by the design studio that form effective bonds towards place attachment [Chow and Healey, 2008]. In this context, McLaren also sees the design studio as a "safe space," providing access for all students to a certain level of infrastructure and, therefore, hiding the inequities (URL-1). As safe spaces, design studios and their threshold spaces accommodate diverse contacts and interactions, many of which are not directly accessible to disadvantaged students. In Istanbul, one of the largest metropolises in the developing world, students from low-income families face the bitter fact that the city has limited public spaces that are part of design culture and accessible without economic power. Design studio empowers the students with the attachment to a design school that provides formal and informal opportunities to be part of the network. Transition to online education disrupts this multifaceted safe space and undermines the emotional bonds nurturing the students' feelings of safety and security. In the absence of such a safe space at design studios, digital technology can hardly act as an "equalizing force," as many

instructors have already noted [Corcoran, 2020]. FADA students' responses revealed the studio's role as a balancing social environment that seems challenging to form on online platforms.

### **6. Changes in Time-Space Routines**

David Seamon [2020] suggests that daily activities create routines within the rhythm of life and connections with place attachments. The everyday activities collectively form an 'existential insideness' that corresponds to belonging within the rhythm of life in place. These routines constitute regularity to create new patterns and emotional bonds [Seamon, 2020]. The strength of emotional bonds with places is strongly related to the residence time as the time-space routines develop gradually in time [Lewicka, 2011]. In design studios, arrivals, critics, juries, and rituals of individual study are the diverse activities composing time-space routines. The design studio becomes a constantly alive space by these daily, weekly, and termly patterns. The constant use of space and its distinctive routines reflecting the progress of the design project is markedly different from being in classrooms with sharp boundaries of occupation time. Students at MEF reflected this as they underlined the loss of the routines of work they had before at the design studio. They rightly noted that work settings at home or in public spaces during online education lack such a stimulating pattern.

Online education was challenging at first, and of course, my work routine and form had changed. I had to concentrate twice as much as I do in school and work a little more than my regular and planned work. It was more difficult to understand and express ideas because of the lack of the physical environment. Therefore, we had to come a little more prepared than we usually do before the lessons.

As the students noticed, they found themselves caught in between the clashing routine of the residence and the routine of the design process.

I think the routine of the lessons changed. The environments we are in have a certain routine. For example, Hangar has a particular course schedule, but we were creating our routine within this program. When we switched to online education, we have moved into an environment that already has its particular routine. Adaptation to the new situation changed the way we study and our routine in terms of working hours, study settings, efficiency, and many other things. Whether the change is good or bad depends on the new environment in which we continue to work.

Therefore, students' experience of the change was not only by the detachment from the physical environment but also loss of the time-space routine created there. Students' positive appraisal of the online education rested on their ability to synchronize the routines of life at the residence and the routine of the design process inherited from Hangar. As underlined by students' responses, a positive development in the students' daily routine was the saved time spent for commuting. In a metropolis without an efficient public transportation system, online education also meant the possibility of avoiding lengthy and crowded commutes between the university and residence. Students cited saving the time spent commuting to the university as a positive factor for their wellbeing and concentration on their education.

[...] The time I spent working has increased since the time I spend on commuting has disappeared. I have managed to study more comfortably for more extended periods. Yes, I have a problem with concentration at home. But since I don't have to commute to school, I feel less tired, and I can spare more time for my lessons. With online education, the working hours I spared for the project course have increased, and I began to use the course hours more efficiently.

Recalling Seamon's [2020] remarks about the relationship between recurring daily routines and place attachment, students' perception of

the design studio can be approached as an essential part of their daily rhythms. It is the capacity to adapt to the time-space routines that determine the nature of the students' adoption of the new pattern as positive or negative.

### **7. Conclusive remarks**

Educational institutions are responsible for enriching the learning processes and providing institutional support for the students during these processes. The sudden and inevitable transition to online education platforms has created opportunities and challenges alike. The change provided encounters with new educational tools and enabled quick interaction and communication in these online tools. Nevertheless, maintaining studio culture and interaction among students and professors emerged as challenges, despite replicating many aspects of the design studio by online education tools. Furthermore, there is a fair demand for safe space, place attachment, and equal opportunity in online education.

Online education should venture beyond the straightforward adaptation of online tools in design education, considering the positive role of place attachment in academic achievements. Design schools found themselves in a position of substituting the social relationships and collective identity in the design studio with the online education tools. The absence of the physical design studio exposed the social and economic inequalities among the students. Responses of the FADA students in the interviews demonstrate that the inequalities among the students should be a significant concern to be able to provide inclusive online education. The changes in the time-space routines were one of the major outcomes of the loss of the physical design studio. Students are composed of diverse individuals with varying capacities of neatly overlapping design studio routines and the routines of the living spaces together. For some of the students, the living environments do not necessarily provide them the freedom of establishing individual spaces and routines. Design education entails a vibrant tradition of collective work revolving around the physical design studio. Online design studios have the potential to replicate this by

interfaces that can host visuals of group works in a synchronized and informal manner. Recreating the design studio in online education can be plausible only by taking the diverse capacities of the individuals into account and forming student-oriented strategies.

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# Situated Learning in Online Architectural Studio Education

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**Abstract:** The pandemic causes acceleration in the development of online education. Relatedly, instructors have started to transform already applied methods in studio education and have produced new teaching methodologies in remote education. Since the communication channel in the new system is exposed to a change that creates that open an area for the search of situated learning in terms of interaction among students and between students and instructors that is strongly associated with Vygotsky's theory of the zone of proximal development in which social interactions is emphasized in learning. In this paper, the components of situated learning will be reading through an online design studio in architectural education. The changing concept of studio culture will be inquired from the issues of the learning environment and situations executed after the shift from physical to digital encountering. Moving of design studio into the online environment brings particular changes to the two aspects of the studio culture, which are studio as a method and studio as an environment. In this respect, an online design studio will be examined as a contextual framework with the theory of situated learning.

**Keywords:** The zone of proximal development, situated learning, online education, architectural studio.

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## 1. Introduction

The pandemic, COVID-19, has fastened the ongoing trend towards online education in the age of information. As a first reaction to this rapid change, instructors have tried to use known methods, which are used in face-to-face education. However, in some respect, applying these methods requires different research with the ingredient of the online studio environment. Because of that, in the first step, the main cause for this adaptation was reasoned as technological rather than educational (Johnson et al., 2016). Since the duration of distance education has been extended, the aim of the educational staff transforms from crisis management through education as well. In this

process, using effective tools and methods, which are so important in online education to attract the students from a screen of the media, becomes a crucial part of the education more than traditional education. This complicated environment faced by student and instructors bring a different situation and requires re-construction of knowledge more than usual and open a new research area to examine situated learning that needs re-construction of knowledge in different contexts following different interactions.

The key components, which define situated learning, are interaction among students and between students and instructors, authentic

activities, contextual situations, and interactions with society and cultures. The base of it, in the learning environment, is argued by Lev Vygotsky (1978) that learning has proceeded through the social interaction of the individuals in the zone of proximal development. Improvement in this zone is associated with the internalization of individually mediated social interaction. From this point of view, situated learning differs from traditional learning methods, in which students encounter different situations related to the activity and its context and learn in more interactive ways.

In architectural education, being a special setting for education due to the characteristic of learning by doing, the studio environment provides a physical production area, in which students spend more time than regular class settings and the studio transforms into a socio-spatial environment for the students and the instructor. Accordingly, the design studio includes various spontaneous encountering that could be integrated into education, indeed, as a part of education. However, with the changing ontology of spatial and social beings of the studio, distance learning in architectural studio education is needed to be some adaptations and changes. Besides the integration of the digital tools to sustain the studio education, being away from a social studio environment and lack of everyday sociality in the campus environment leads students to social isolation (Davies and Graff, 2005; McGuire, 2019; Smiley et al., 2020 in Yorgancıoğlu, 2020) which restricts the students' zone of proximal development.

This paper aims to produce a critical reading based on the effects of social isolation through the studio culture. Indeed, understanding social isolations not only refers to the physical remoteness from the learning environment but also covers the lack of interaction of the students in the online learning environment held in different platforms. In this respect, while online design studio will be examined as a contextual framework within the learning environment and situations executed after the shift from physical to digital encountering, the theory of situated learning as a social learning theory will be used as a theoretical framework

to understand the importance of the social interaction in education.

## **2. Theoretical Framework: Situated Learning**

In the 1970s, the researches on education demonstrate a transformation by cognitive scientists to develop an intelligent tutoring system in artificial intelligence (Rumelhart, Bobrow and Collins, 1975; Sleeman and Brown, 1982; Wenger, 1988 in Saivyer and Greeno, 2009). Thereafter, in the early phases of the 1980s, the number of works was increased about cognition and learning, and learning was covered as an internal individual mental process. However, during the 1980s, social scientists began to inquire about the role of interaction in cognition and learning. Accordingly, it is recognized that the social arrangements, namely situations, are fundamental while defining what is learned (Saivyer and Greeno, 2009).

The term, situated learning was first used by Lave and Wenger (1991), based on Lev Vygotsky's (1962) zone of proximal development and as a critic of Brown's (1989) cognitive apprenticeship (Saivyer and Greeno, 2009). The zone of proximal development is introduced by Vygotsky (1962) as a social theory of learning that emphasizes the role of social interaction in individual cognition and learning capacity. According to his theory, each individual has the actual development level and potential development level. The distance between them is described as the zone of proximal development which occurs with the guidance of a more knowledgeable other (Vygotsky, 1978). The other critical point in this learning theory is, learning occurs socially, however, each needs to internalize the knowledge to conceptualize what s/he learned which could be used in other contexts. Because according to him, there is a difference between what is experienced and what is learned that an individual learns more than experienced situations with the internalization and conceptualization of the knowledge (Vygotsky, 1978). Application of knowledge occurs with the conceptualization of the idea, which is "mindful abstraction" extracted from the

original idea and could be applied in the different context (Salomon and Perkins, 1989). Furthermore, the social developmental theoretical background of Vygotsky (1962, 1978) constructs the main argument of the situated learning. According to this theory, knowledge is reconstructed and deconstructed through the communication and exchange occurring between people and their social and cultural context (Billett, 1996). Action in these contexts defines the obtaining and applying of knowledge in everyday situations (Lave and Wenger, 1991). In the explanation of situated learning, Lave (1988) defines knowledge as a tool that is used following the situations and continues to store in the memory.

Similar to Lave and Wenger (1991) and Vygotsky (1978); Brown, Collins, and Duguid (1989) believe that to achieve meaningful learning, it should be embedded in its social and physical context. Namely, the interaction between learners, and learners and tools play an important role. Moreover, Brown et al. argue that the concept of abstract learning creates a gap between the knowledge and authentic context and prevents the application of the knowledge in real-life situations. Knowledge could have a changeable meaning according to the activities and situation. Relatedly, they produced the cognitive apprenticeship, which focuses on the process rather than the end-product of learning. Accordingly, knowledge could be transformed from one situation to another (Brown, Collins, and Newman, 1989). Gee (1997) emphasizes the importance of cognitive apprenticeship that without the situated meanings, knowledge acquisition becomes too general or specific for usage.

Cognitive apprenticeship as a model for the situated learning is improved to the application of the learning in authentic practices in everyday life. In authentic apprenticeship, learners work with each other and the tutors to reach the same level (Lave, 1988; Lave and Wenger, 1991). In cognitive apprenticeship, learning realizes via activities, cultures, and contexts (Lave and Wenger, 1991). In terms of practices of the community, Lave and Wenger define it as legitimate peripheral participation.

This concept is improved as a critic of Brown's (1989) cognitive apprenticeship. In terms of legitimate peripheral participation, the newcomers of the community, observe the old members and begin to experience the culture every day and s/he came to the center from the periphery, namely transform from apprenticeship to master, by becoming himself/herself a more knowledgeable other.

Lave and Wenger have improved the situated learning with the background idea of "... learning all defined relative to actional context, not to self-contained structures" (Lave and Wenger, 1991: 15). They emphasize the situated character of communication and human understanding. This understanding creates a shift in which social engagements take the place of the individual cognitive process. The learning process is executed in the participation framework, rather than the individual mind. Namely, it is distributed among participants. An increase in participation refers to the production process. Getting skills is acquired during the process under the condition of legitimate peripheral participation, which is the crucial characteristic of the process. Behind it, Lave and Wenger believe that learning has an actional ground (Lave and Wenger, 1991). Moreover, in situated learning, what is learned is dependent on the situations in which it is learned (Lave and Wenger, 1991). In this respect, cognitive apprenticeship emphasizes that working on a task is easier than working on the same problem individually (Brown et al., 1989; Hansman, 2001). In some respect, situated learning also refers to experiential learning because, in the class environment, it is held by learning by doing (Hautemo, 2016). Moreover, since it is thought that the root of the situations are action base, experiential learning becomes stronger, as situated actions (Woolgar and Suchman, 1989)

### **3. Contextual Framework: Online Design Studio and Studio Culture**

The design studio is a strong pedagogical tool in art and design education (Crowther, 2013). One of the most comprehensive definitions of the studio was done by Donald Schön (1983) that in the traditional environment of design

education, students are assigned problems and they tend to solve them through the projects. In the process, while they are working on the projects, reflective practice, and a dialogue of thinking and doing, they learn how to design (Schon, 1983). In terms of learning, the studio includes observations, experimentations, crits, making, doing, and reflective thinking (Boling, 2016; Marshalsey and Sclater, 2020). In these processes knowing, thinking, and acting are executed within a reciprocal relationship. With these characteristics, it provides a unique setting in practice-based art and design education for experiential learning (Crowther, 2013).

Online Design Studio was improved as an alternative for physical studio education in the early 1990s as a branch of distance education (Nilsson, 2014). The first example was a two-week project held by the collaboration of Hong Kong University, University of British Columbia, Harvard University, Harvard Graduate School of Design, Escola Tecnica Superior d'Arquitectura de Barcelona, and Massachusetts Institute of Technology. However, due to the level of improvement in communication technologies was not enough in those years, the project was improved mostly with asynchronous methods as e-mails, shared CAD files, and conference calls (Wojtowicz, 1995).

The movement of the design studio from the physical spatial environment to the online platforms creates a need to use digital tools to sustain ongoing methods as crits, learning by doing, and reflective learning. With the improvement in information and communication technologies, the software systems used in learning management systems become capable of applying traditional curriculum and methods. With the technological developments, text-based collaborative environments transformed into 3D virtual ones (Maher et al., 1999; Nakapan and Gu, 2011). Accordingly, the emergence of global teams and acceleration in cultural interaction supports teaching design education virtually (Marshalsey and Sclater, 2020). In this respect, creating a collaborative environment

becomes the hot topic since this online environment can collect people from different regions in a platform and enables them to work together. Namely, the time and space understanding is expanded with the online environment and digital tools.

After the gradual overcoming of technical difficulties encountered by students and tutors, the social aspects of the studio culture have been problematized. Although in the methodological dimension, the collaborative working environment is materialized, in the social level, the group members work on the different parts of the project, and relatedly, this situation leads to co-operation, which prevents the personal synergistic process between the individuals (Kvan, 2000). In terms of design education, similar to the remote working process, students apply the same method in the group works that different parts of the assignment are worked separately and at the end of the process they combine them. The whole process is carried out individually, getting advantage from other perspectives and mental development through sociality are executed at a minimum level due to the changing meaning of collaborative working. Although it is believed that the online studio fastens the independent learning process and encouraging the creation of meaningful knowledge (Krämer et al., 2015), students could less their way of learning in this too much freedom with the question of how and when they interact (Sun and Rueda, 2012). However, through reflective thinking, observations, and learning from each other in the physical studio environment, students can control their freedom and creates a reciprocal relationship between individual learning and interaction. Since online design studios separate students from the physical environment, it can lead to danger as detachment from the surroundings which means to elimination the socio-cultural reality of the studio environment (Achten et al., 2011). Accordingly, the detachment from the physical environment creates the first step for social isolation, which eliminates the spontaneous encountering of the physical environment. For example, students are always able to see others' projects in the studio environment and tend to observe and

discuss them even at out-of-course times. It creates a working-based social area which is an unconscious natural setting rather than an already design place. However, in online working environments, at least at the first stage, there is a need for conscious studio design for communication.

The spatial learning environment of the studio provides a good opportunity for its users in terms of creating social interaction (Marshalsey and Sclater, 2020). Informally or formally, it is assumed as a collaborative working environment, in which students, instructors, or other members of the studio learn collaboratively (Boling, 2016; Vaughan et al., 2008). Moreover, as a learning environment, the studio could be assumed as a simulation of the real world with its sociability, culture, and spatiality (Schon, 1983). Based on the characteristic of the design studio, contextualization of the studio is done as the method of learning and the learning environment. These two characteristics of the studio are so integrated into each other to transform the knowledge in practical-based disciplines (Lynas, Budge, and Beale, 2013). Accordingly, Walter Wendler and Julia Rogers argue that a studio has a specific culture (1995: 326) "Design Life Space... ... address social, environmental, geographic, economic, and climatic parameters, to name a few. Context definition defines those parameters through which relationships of ideas and values are viewed and judged." Moreover, "The studio culture, defined by all participants as a mode of interaction around a discipline-specific subject, mimics the informal modes of acquiring, appropriating and sharing of knowledge of everyday social interactions" (Catina, 2020: 2). Relatedly, while studio culture is tired to integrate into online education, there is a need to work on the changing lifestyle in which adaptation problems to the virtual environment, the uncomfortable feeling among the foreign people, lack of socializing between students causes social isolation and prevents the success in studio education.

#### **4. Situated Learning in Online Design Studios**

Due to the COVID-19 pandemic, in social isolation, daily life practices of the students in the learning environment have been exposed to deep change that waking up and opening the computer has taken the place of going to campus for both education and sociality. The same situation reflects on architectural education that the studio environment as a social activity hub becomes physically inaccessible (Sun et al., 2020). This physical distance resulted in a decrease in social interaction, at least finding a different communication method. Even if they overcome the problem of interaction caused by physical remoteness, students rarely have a chance to meet those with who they do not familiar before distance education. The decrease in social interaction is elevated by the feeling of discomfort and difficulties in the online education platform. Therefore, some of the students pull themselves back more than they normally would. Although students may be in social isolation in physical learning environments, the possibility of finding themselves isolated in the online environment is higher since they are not exposed to a spontaneous interaction or being physically in a class environment. As a result, the interaction, which is already born difficulties, becomes more problematic. Since social interaction has the main importance in social learning theory, broadening the zone of proximal development is impeded. Because to extend the zone of proximal capacity for learning, individuals need to interact with other people.

By stating Vygotsky's zone of primal development, Strauss (1993) emphasizes the gap between potential and actual learning conditions. This gap fills and extended with the mediation, or internalization, of the social and cultural interaction. Interactions between the individuals have the role of "cognitive change catalysts" (Weibell, 2011: 136). In the online education process, students have difficulties creating a connection with their peers and instructors out of the course time and this situation directly affects their actual level of learning, relatedly proximal development. For

example, an analysis done with first-year students of business degree demonstrates that although participation does not affect the passing grade, there is a significant difference between passing and failing students' participation. In all sections of the course, the participation level of failed students in the discussions is lower than those who follow the course by discussing (Davies and Graff, 2005). This research done to understand the effect of social isolation on the grades and anxiety level of the students demonstrates its necessity.

Another critical point of the zone of development is the answer to what is learned is not an acquiring a piece of information, rather, it defines the new development level with the guidance of the instructor, as more knowledgeable other (Strauss, 1993). Furthermore, in this understanding, the role of a more knowledgeable other is to increase the encouragement of students through independent learning (Moll, 1990). In this respect, for the achievement in situated learning practices, while the learner has the active role who directs the learning process, the instructor's role is one of the external interventions for an interactive learning environment. In terms of online education, the instructor needs to offer online media and different interaction models for deeper understanding and mediation of the knowledge in the cognition of students (Yarbrough, 2018). To transform the virtuality of online education into authentic activities, Herrington, Reeves, and Oliver (2006) suggest seven requirements in the tasks which need to be ill-defined, have sub-tasks, have larger periods, have different perspectives for achieving, apply in different areas, and collaboration and have different ways of solving and outcomes. Among them achieving different perspectives and work in collaboration could be the solution to prevent social isolation. To create a collaboration in online learning, preferring group works is more crucial than do that in regular education. Besides preventing social isolation, working with others make the student familiarize with the different perspectives and able to extend their zone of proximal development (Brieger, Arghode, and McLean, 2020). Since online education does

not allow spontaneous encountering for knowledge exchange or social interaction as it happens in the physical class environment, organized spontaneity could achieve for filling this gap. Moreover, besides the prevention of social isolation, a well-organized online design studio supports the students' social interaction that includes people with different cultural backgrounds. The variety of participants can be increased and encountering different cultures and perspectives could be implemented to the studio (Rodriguez et al., 2018). For example, İstanbul Technical University organized a mixed studio for fourth and sixth-year architectural design studio students that include physical and virtual studio entitled IOKOKENT- a global multidisciplinary network on housing research and learning and held with the School of Architecture of Valencia, Spain, Lisbon University Institute, Portugal and Gebze Technical University, Turkey. In the project, group works were held to enable the communication of the students, and, 29 percent of the 45 comments expressed the need for more direct communication and group works with the international students, which makes the platform more interactive and real (Alkiser Bregger, 2017). On the other hand, in another case experienced with 617 students in the department of architecture from 15 universities in Jordan, 79.5 percent of the students express that group works are not effective and the quality of the production is limited in collaborative online education. Although they want to discuss their projects with peers and have an idea with other projects as a tutorial, working together on the online platform does not work (Alnusairat et al., 2020). Based on the examples, it is clear that students tend to learn other perspectives and awareness of the importance of the interaction, however, in the assignments they have difficulties coming together. Rather than offering a group assignment, in-class activities could be the solution to make meetings easier and creating an interactive environment without stress.

Active participation and being a part of group work should be supported, however, for those who continue to protect their silence during the courses, the online studio environment needs to

offer something new for their achievement. Although active interaction is emphasized in both regular and online education, the role of passive participation in online learning communities cannot be ignored. For example, in the online graphic studio course held in Utah State University (USA), students were wanted to submit a post about the weekly lectures, and each student was required to respond to another two students' posts. This method that is used to increase students' interaction is to make them familiar with the other students' work. When students have an idea about the works of the others, their anxiety level about the course decrease (George, 2018). In an online design studio, students can follow the outputs of online tools such as discussion groups, tutorials, and forums. Michael Beaudoin (2002) indicates them as invisible students. Moreover, spending time at the online learning-related tasks of these students more than active participants. In passive, interaction with the tools becomes more important and students have passive interactions with the discussions or the works of other students. A large-scale study of 3000 students and 3 years, held at the School of Engineering and Innovation at The Open University (UK), emphasizes the importance of passive interaction. In the research, a positive correlation is viewed between students' visits to slots and success. Moreover, one of the students indicated that they can have a chance to making the right thing or not by comparing it with others' work (Jones et al., 2020). It is a positive part of online education that may not be sustained at face-to-face education. Students who feel uncomfortable at the synchronous discussions have a chance to integrate themselves into the legitimate peripheral participation at the minimum level.

However, these all researches also demonstrate that active interaction in an online environment has a bigger role than passive participation. Because, social presence is a necessity for teaching and cognitive presence to reach "higher-order thinking" (Armellini and De Stefani, 2016 in Jones, Lotz and Holden, 2020). Moreover, in the same research, a student expresses the importance of active interaction that distance education is difficult, and with the

interaction, it becomes easier. Constructing a shared experience is a key element (Jones et al., 2020). Students can learn by themselves and increase their knowledge comprehension but without the assistance or guidance of peers or tutors cannot increase the potential development level.

Since the physical studio environment provides a setting for students to interact to work and discuss out of the studio course time, students need to be part of this kind of digital environment at distance education. Institutions' online learning management systems have a restricted background for it and students argue that in the system, they beware to share their ideas due to the hierarchical relationship between instructors and students. Referring to this system, to increase the direct interaction between students and students and tutors in distance education, WEB 2.0 tools, as social media has an important role to create a collaborative working environment (Rodriguez et al., 2018; Schnabel and Ham, 2013). Since the new generation of students is so familiar with these technologies and platforms, an adaptation of its use at the online studios increases the interaction between students (Ham and Schnabel, 2011). On the other hand, a combination of social media and search engines makes people decoders, rather than applying the knowledge within a different context (Mallgrave, 2010). In this respect, tutorials and assignments organized by the tutors have an importance that should be a focus on emerging the creative thinking mechanism of the students.

Schnabel and Ham (2013) argue the failure of the online management system in architectural education-learning digital due to the lack of connection with learning digital-social digital (Figure 1). Learning Management System (LMS) and socializing have a distinct border and are not connected. What they learn does not have a connection in their interaction in the social digital life, which prevents the internalization of the knowledge. They just get some knowledge during the course time and have an interaction out of the course, in which interaction is not over the knowledge achieved

due to this border. However, engagement needs a central place for the construction of knowledge and architectural students should have an opportunity to engage with each other to support the design decision. In a design studio, there is a sharp borderline between the modes of communication and the learning environment that needs to be overcome. Furthermore, they indicate the importance of effective use of social networks, such as Facebook. Because it provides a two-way experience to the students which are acting as learners and researchers as making contributions on the related subject area (Schnabel and Ham, 2013). As experienced in the studio culture students socialize while working. In this respect, some parts of the interactions are focus on the design course. Because the working environment and the social environment are the same. However, in online education, this coordination could be easily changed by the students because it is a kind of preference, not a situation they are exposed to.

In order to create the studio culture in the online design studio, user-friendly platforms such as social media play an important role. In the research of Şule Tatlı Pektaş (2015), a five-week collaborative project was held with two groups of students from different countries, for which students were responded to a green and sustainable building. After one week of traditional face-to-face education, students continue to study in an online studio environment. In the online studio part, besides learning management systems, a forum and Facebook page were integrated into the online studio and. As a result, students indicate that they feel more comfortable with Facebook while sharing their ideas since there is no hierarchy between instructors and them. Although the forum is a kind of informal part of the studio, it still becomes too formal for them. Moreover, apart from socializing, students use social media pages for discussions and sharing related documents about the project (Pektaş, 2015). It proves that students feel more comfortable in the online social environment

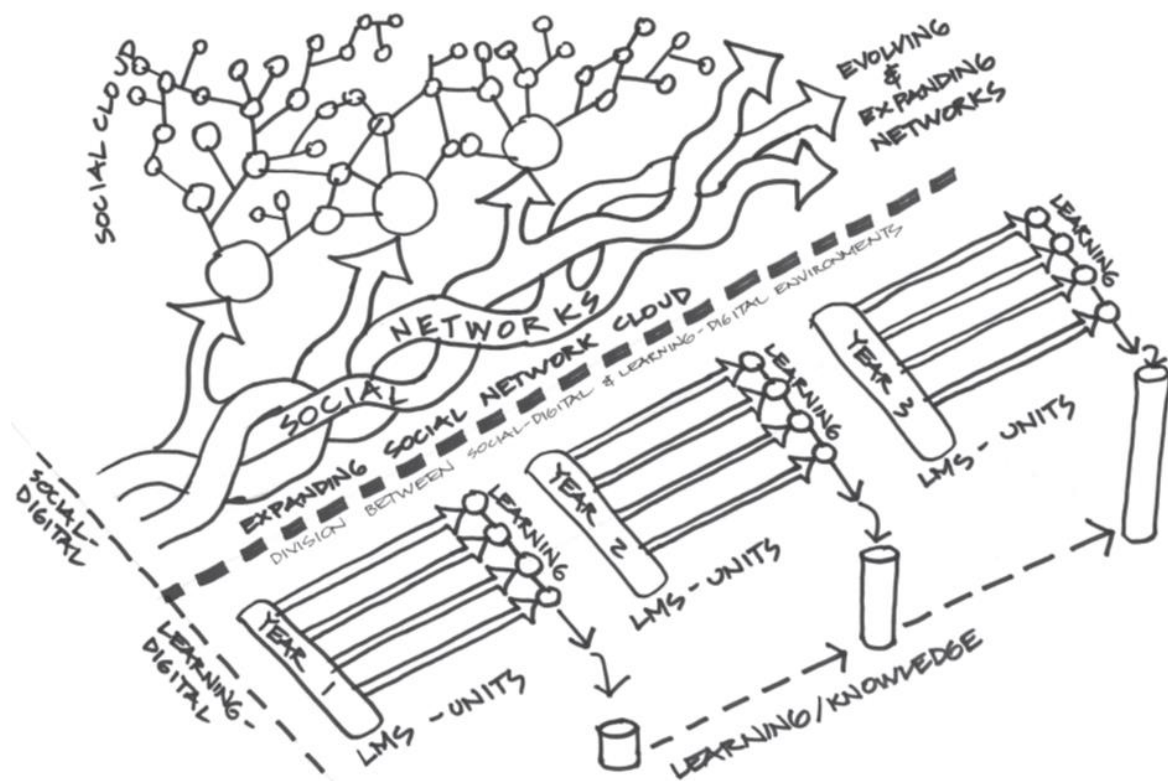


Figure 1: The division between learning digital and social digital (Schnabel and Ham, 2013)



for interaction and knowledge exchange. While students are in the traditional design studio, spontaneous encountering, relatedly interaction with the others the out of the studio is does not need to be so integrated with the curriculum of the course. Or it is placed at the hidden curriculum. However, in the online studio environment, since students do not have this opportunity, there a need to integrate it with the social environment that includes professional practices and other perspectives. In order to create an authentic activity in an online environment, it should offer interactions different from conventional studio programs (Rodriguez et al., 2018). There is a need for mediation between learners and social aspects.

Another important part of online education is the issue of sustainability. Students' motivation and success are decreasing at the later stages (Jones et al., 2020). A social activity and social presence become more important in this part because they do not want to attend studios in which they cannot demonstrate their social existence. Moreover, the online design studio allows freedom to students in terms of management of their times and planning the learning process, and supports independent learning (Krämer et al., 2015). However, in legitimate peripheral participation, students are far away from the center, and independence of their knowledge acquisition should be increase gradually, not at the beginning of education. Relatedly, as mentioned above, in online education, students are supported for interaction to make them achieve an improvement in the zone of proximal development, internalization of the knowledge, and to prepare them to the level of independent learning.

## **5. Conclusion**

Due to the pandemic, COVID-19, digitization has started to accelerate much more than ever before. In normal conditions, the development of technology and its adaptation through the environment will take between five and ten years. However, these days, these improvements took place just in a year. This allowed us to test the simulation of the future in real life. Although carrying education through the online platform has been executed, with the

pandemic, educational institutions have to make it in just a short period.

Since design studios are based on the learning by doing approach and giving an unusual learning environment where is a social space as well, this adaptation process brings more difficulties than the other courses. It begins to lose its collaborative social environment, a Design Life Space (Wendler and Rogers, 1995). In this setting, appropriation, sharing, and acquiring knowledge occur informally but concerning the discipline-specific subject. Students' zone of proximal development extends its borders unconsciously. However, while this physical social setting is carried through the online platform, a lack of situated learning activities demonstrates itself. Motivation, success, relatedly grades of the students start to decrease. Without interactions, the students find themselves in an information pool and lost their excitement about the studio. They need to show their presence and have a relationship with the peers, tutors, information. Moreover, it is important to keep in mind that, the social settings of the students' change. In online education, their domestic environment intersects with the learning environment (Gül et al., 2012). And, re-construction of the knowledge is done with the domestic environment, not in the learning environment. They lost one of the biggest parts of studio culture in which subject-related discussions have a continuous flow.

From this point of view, the online studio environment is needed to be improved with the social settings. In studio education, gathering knowledge, and increase the elements of repertoire are so related to social interaction. Although social media or any other web tools support the students' development by opening an area for interaction to support situated learning, it cannot compete with spontaneous unconscious learning. Online education offers great opportunities in terms of creating an environment for interaction between different localities anywhere in the world. However, in the social dimension, this so-called togetherness does not operative.

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# A Critical Assessment of an Extended Learning Environment in Interior Design Studio

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**Abstract:** This paper presents a critical assessment of an interior design studio that was constructed face-to-face then online as an extended studio environment through spatial and technological means. In the Interior Design Studio III, students were expected to design an experiential retail store aiming at answering the contemporary customer and brand interactive experience. The concept of ‘interactive experience’ was central not only in terms of a project outcome but also of the studio process: an experiential learning environment is designed to enhance the understanding of the design studio. Within this scope, the collaboration with the maker lab of the university provided technological interfaces and analog model making methods while also expanding the limits of studio space. The interactive experience would not only result in the project outcome but also be integrated to the studio model. This studio model and the topic was conducted face-to-face in the campus three semesters consecutively, while the following two were held online. The study is based on exploratory research using qualitative techniques to analyze the design process of the students in the face-to-face and online experiential learning environment. The main objective is to overview and assess the interior design studio by providing a new perspective to the students about space and user relationship regarding interaction and atmosphere not only in terms of the given design problem but also the ‘environment’ they are experiencing the ways of design.

**Keywords:** Interior design studio, Interactive experience, Experiential retail design, Extended learning environment

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## 1. Introduction

Interior design is not only a physical medium that solves spatial problems in a functional, aesthetic, technical and creative way but also it is an interactive mechanism that constructs the user's relationship with the space. The interaction between humans and the built environment has always been an essential factor that shapes the architectural space creation process. Architectural space is experienced not only intellectually but also emotionally and sensually with the whole physical body. As Mallgrave points out “architecture is at heart a

more deeply embodied phenomenon than the merely visual; it deals with many more sensory and subliminal dimensions (spatial, material, and emotional)” (Mallgrave, 2010, p.159). In architecture and interior design education, although students are encouraged to perceive the multi-sensorial qualities of the space that are appealing to the skin, ear, nose, body and skeleton (Pallasma, 2014), the experiential space experience often falls short of reflecting on the studio outputs. Considering that vision-based representations are dominant over other sensory modalities in architectural design

practice, it can be understood that creating designs that appeal to other senses in addition to visual perceptions is a challenging process for interior design students. In a study which included interviews with various practitioners, even experienced architects have been found to neglect the body in their design practice rather than the anthropometric properties (Imrie, 2003). Same study reveals that in architectural design education, the body gains little attention as well. However, in order to create a functionally and aesthetically integrated spatial experience, interaction of the body with the built environment should be considered in a holistic approach, where experience is embodied in a multi-dimensional level.

In this study, in order to extend the students' understanding of multi-sensory perception of space and encourage them to design embodied experiences in their studio projects, it is aimed to create an experiential learning environment in the interior design studio. To extend the traditional studio model, which is based on hands-on learning in a physical studio environment, the proposed studio program is constructed around several precedents for students to practice a more intrinsic learning model. The data of the assessment consists of students' weekly submissions on LMS (including juries and presentations) and the field notes (discussions, jury critiques, instructors' observations). This data is then analyzed based on the literature review on retail design, interactive spatial experience, design studio and the expected outcomes of the proposed studio program, assessing the face-to-face and online studio experiences. It is crucial to note that these outcomes are separated from the main learning outcomes of the INAR301 studio in the curriculum. The proposed studio program offers a new means of understanding the studio environment enhanced by the collaboration of the maker lab, which eventually would provide a different perspective towards the spatial design problem, and consequently would enrich the very spatial experience itself and be reflected in the outcomes of the studio course. This paper looks at the means and limitations of this extended studio model in the changing mediums.

## **2. Literature Review**

### ***Experiential design and retail design***

As mentioned above, the interactive spatial experience is located at the center for the case of the interior design studio, in order to extend the students' perception of space in a multi-modal, embodied, enactive way. Interactive experience occurs as a result of the interactive dialog between our perceptual capacities, embodied being, and the affordance of the environment (Yakhef, 2015). In this context, design problems that are assigned to students are constructed in such a way that they would examine both the pure relationship that the body establishes with the space and the ways to enrich this interaction through the use of analog or digital interfaces. With regards, students first work on brand representation in the context of space-place, where they create a spatial experience of the brand identity using only physical means and then on experiential retail store in the process that consists of two phases. In this first phase, it is aimed at students to make practice of transforming conceptual knowledge of the brand identity to an embodied physical experience before moving to the design of the actual retail store. Given that design is a dynamic process of adapting and transforming prior experience knowledge (Oxman, 1990), this first phase was planned to accommodate as a design precedent for the students. In this phase, students concentrated on only the abstraction of brand identity and its physical manifestation as a spatial experience during the first six weeks. Thus, providing the basis for exploiting the conceptual knowledge of precedents as Akin (2002) suggested, where conceptual abstractions derived from it bridge between the conceptual and the physical (Akin, 2002; Oxman, 2004). Other precedents were also introduced during the semester to help them to turn the knowledge into abstract modes and apply them to their retail store project, which are shown in Table 1. The concept of interactive spatial experience is extended into a new realm in the second phase of the studio, where students were introduced to the concept of 'experiential retail store'.

Experiential retail store is derived from the retail understanding where brands market the

"experience" created by the product than the product itself. The rapidly changing consumption patterns in the last two decades have led the retailing industry to keep pace with this process and to conduct sectoral and academic studies on the development of the concept of customer experience. The studies on customer experience modules by Schmitt (1999; 2003; 2010), Brakus et al. (2009), and Verhoef et al. (2009) provide the theoretical framework in the literature. According to Schmitt (1999), experiential marketing differs from traditional marketing that it considers customers' sensory and emotional experiences rather than treating them as rational decision makers who only consider functional features of shopping activities.

In this context, Schmitt (1999) suggests five different experience modules that should be managed in experiential marketing; sensory experiences (SENSE), emotional experiences (FEEL), creative cognitive experiences (THINK), physical experiences, behaviors and lifestyles (ACT), and experiences arising from social-identity and culture (RELATE). Similarly, Verhoef et al. (2009) discusses the customer experience with a holistic perspective that includes the customer's cognitive, affective, emotional, social and physical responses that the customer establishes with the retailer. In particular, the fact that shopping via the internet accessible from anywhere at any time of the day increases the importance of in-store sensory and interactive experience. Servais et al. (2019) define the characteristics of the experiential retail space as focusing on the customer experience, establishing a strong relationship with brand identity, providing customers with more than the in-store "selling products" function and often providing an "unexpected", original experience. Moreover, studies in the literature show that the customer's experience in the store has a significant impact on retail sales. According to Bagdare and Jain (2013), contemporary retail is shaped by "experience stores" that increase customer satisfaction and brand loyalty by providing a pleasant shopping experience. As the importance of atmospheres that elicit positive emotions in customers grows in retail sales, the

role of in-store interactive experiences, socializing, and communication areas in space organization grows. Correspondingly, retail design is now recognized as a distinct transdisciplinary design discipline concerned with the creation of virtual and physical spaces in which to sell products and services to customers (Quartier, Claes and Vanrie, 2019). At this point, the role of the interior architect/designer in the design of the retail store is to enhance the "customer experience" by creating an atmosphere that is integrated with the brand by considering the different aspects of the customer experience. In this context, it goes beyond the sensory and physical properties of the atmosphere such as light, sound, color tones, temperature, material texture, as in Pallasmaa's (2014, p.21) definition, atmosphere is "an experiential property or characteristic that is suspended between the object and the subject".

In interactive spatial design, the flow of interaction and the spatial design supported by technology should be considered from the conceptual design stage, in addition to the relationship between physical space and human experiences (Ciolfi, 2004). The enhanced in-store experience has the potential to strengthen the retailing industry, which must compete with online sales. Thereby, it is important for retailers to invest in technological advancements that will provide experiences that elicit positive emotions, thereby increasing consumer curiosity and imagination (Cachero-Martínez ve Vázquez-Casielles, 2017). Helmfalk's (2019) research shows that multi-sensory experiences in stores increase sales rates by 3.5 times when compared to traditional stores and also contribute to sales rates by increasing browsing time. Designers, on the other hand, will be the most important actors in this interdisciplinary process, embracing the potentials of existing technologies such as rapid prototyping tools like Arduio and exploring the limits of interactive design with engineers (Hornecker, 2011). The changing retail means and habits have been interpreted in the interior design studio regarding this transformation, and the process and results have been analyzed and revealed through this study.

### *Extended means of design studio*

Design studio offers a collaborative learning and experimenting environment, where the designers practice a “multimodal, multisensory, ubiquitous” communication that addresses the designers’ to “artistic, emotional and experiential ... thinking” and “instrumental and practical reasoning.” (Vjas, Veer, and Nijholt, 2013, p. 415-16). Design studio has long been the subject of alteration via experimentation of digital platforms (Ioannou, 2018); this way of ‘blended learning’ did not provide a complete online design studio experience (Fleischmann 2019) but highlighted the necessary steps to take in order to enhance it (Scupelli, Candy and Brooks, 2019).

One of the ways of elevating the physical studio experience is to prolong the design practicing environment. Referred as an extension the Do-it-Yourself culture soaked in technology, a collaboration with a maker lab could not only facilitate the enhanced physical modelling of the designed spaces and the ‘communities of practice’, but also would reveal the potentials of “hands-on, design-build education to stimulate innovation, creativity, and entrepreneurship” (Forest et al., 2014, p. 2). Maker labs in their own spaces provide tools (software and hardware) and materials for students to ‘express their creativity’ and work and produce together (Hynes and Hynes 2018).

The learning environment of the students has already extended to digital mediums, not only the social media platforms but also digital libraries support this shift. Masdeu and Fuses (2017, p. 14) give an example of distance and blended learning on an international collaboration of virtual design studio, asserting that a mixture of conventional studio practices and distance learning “results in a multiplicity of techniques that enrich and facilitate students’ learning in the studio”.

### **3. Studio model as an experiential learning environment**

#### *Description of the studio model*

The Interior Design Studio III (INAR301) was configured in the Fall 2018 semester as a two-phase design problem on retail design, and has

been consecutively conducted for five semesters (Table 1). INAR301 is the third interior design studio among six in the curriculum of the Interior Architecture and Environmental Design Program, where in their first year students take Design and Architectural Design Studio I in conjunction with the Architecture Program. Theoretically, the students begin the studio with basic structural and computational design courses fulfilled, and compulsorily completed their first two interior design studios. In INAR301, the first problem they deal with is temporary structures via experimenting with materiality and place making: they are asked to design a temporary pavilion in a limited volume for a product-based company they choose without revealing the brand’s name or displaying the products, which requires a thorough research on brand identity (Figure 1). This phase is planned to be the precedent of the second phase where the students are required to design a two-story retail store in an open-air marketplace except for the last semester (Fall 2020) that they were given a semi-open shopping mall to work in (Figure 2).

In order to adapt to the changing retail means and habits, the studio program requires the students to think, investigate and interpret the customer experience, their perception of the brand and the relation between brand and its identity. In the two-phase process, the students firstly work on the brand representation in terms of context-space, then switch to interactive spatial experience. The main nodes of the program are temporary space, brand representation, sensory and interactive spatial experience, tools and interfaces used during the process of design.

The studio program contains a long-term collaboration with the maker laboratory of the university (OpenFab) in which an industrial designer and an electronics engineer offered lectures, workshops, Q&A sessions, and feedback in the juries regarding the feasibility of the suggested interaction methods and available tools and interfaces for their production. Through this collaboration the design studio experience was to extend, new means of thinking and doing were to be



Table 1: Studio model formation process

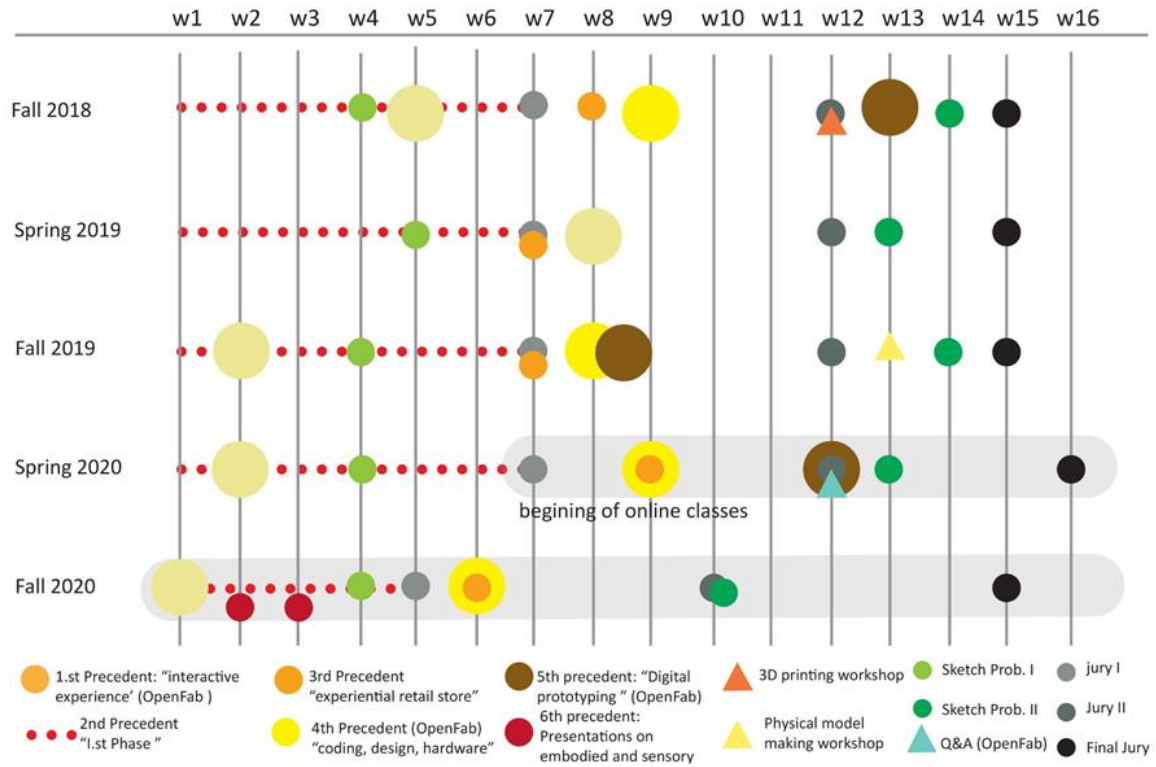


Figure 1: Example from the first phase, photomontage of the temporary pavilion into the actual site. (S23)

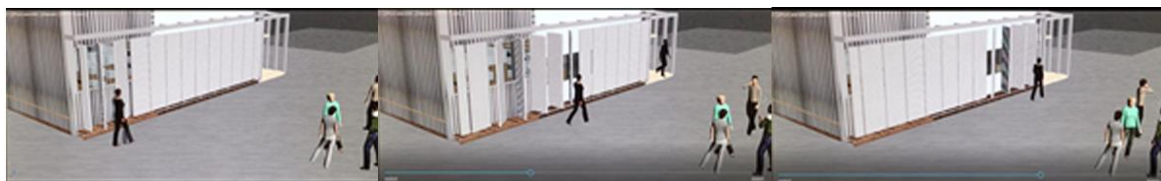


Figure 2: Example from the second phase, animated video of the interactive experience. (S40)

experimented, and technological tools and interfaces were to be explored. Since the given design problem is on spatial experience, it is

considered important for the students to be able to use all the sensory means during the design process.

**Studio environment**

The pilot program was introduced in Fall 2018 semester with a thorough evaluation at the end in terms of the outcomes, scheduling, and the collaboration with the maker lab (Ceylanlı and Aktaş Yanaş 2019). The physical spaces that the program took place were the semiweekly interior design studio (five hours at a time) and the maker laboratory. In the studio, design briefs, critique sessions, student presentations, sketch exams, and juries took place (Figure 3). Whereas in the OpenFab, the lectures on interactive experience, coding, design and hardware in addition to the workshop on Arduino prototyping were provided. Table 1 presents how each precedent and studio/maker lab activity fall on the semesterly schedule.

The following semester, the program of the studio had deficiencies due to the scheduling problems with the OpenFab: the first meeting that involves introduction of the concept of ‘interactive experience’ moved further to the eight week after the first jury and the introduction of the ‘experiential retail store’ followed by student presentations. In addition, the Arduino workshop which was originally planned during the studio hours could only occur after the studio as a workshop open to all students in the university. The participation of the interior design students was lower than expected.

The third semester, Fall 2019, occurred as planned from the beginning: the concept of interactive experience was introduced in the second week of the semester so that the students



Figure 3: a) Jury and b) critique sessions in the studio. (Photos by Z. Ceylanlı and M. Şahin)

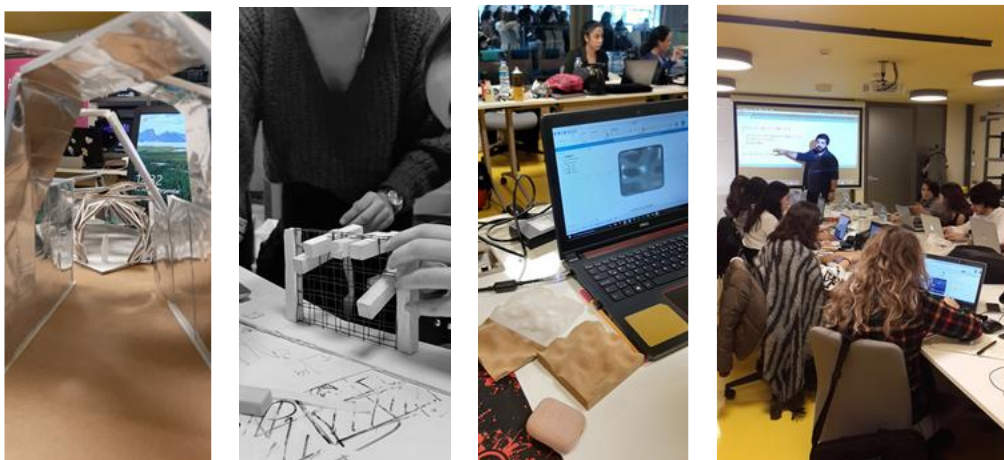


Figure 4: a, b, c) Model making and d) Arduino workshops in the maker lab. (Photos by G. Coşkun)

began to incorporate the very idea into their design project from the beginning. Furthermore, OpenFab offered a model making workshop towards the end of the semester prior to the final jury in order to materialize the spatial and interactive configuration that the students had been working on in their designs (Figure 4). The Spring 2020 semester also began with the same programming until just before the first jury, when the university announced the remote conduct of the classes at the end of the fifth week.

After a week of recess, the studio moved to online platforms resuming from the sixth week, and thus, the first jury. The syllabus was adapted according to the new online situation: Microsoft Teams was introduced by the university which replaced the studio environment, the official learning management system of the university (LMS) was used more extensively for the online critique sessions and remote feedbacks -which enables annotated drawing, writing, audio and video recording. OpenFab offered an extra Q&A session during the studio since the physical model making workshop could not actualize. This, in fact, was not only due to the impracticability of the use of physical means in the maker lab, but also due to the pandemic situation where the students had difficulties accessing the model making or prototyping equipment. Still, the students received the pre-recorded lectures and tutorials of the OpenFab, and were encouraged to use any material they had at home to produce a palpable model of their design.

The obligatory and inescapable experience of the online studio education generated several changes in the topic and the site of the project area in the Fall 2020 semester. The given semi-open shopping mall was in another city and the contextual framework was based upon the significance of the area in the ancient literature. The two-phase program structure did not change. The collaboration of the OpenFab continued as planned. However, additional lectures on multi-sensory experience and body-space relation were inserted therein. The virtual replica of the studio space was Zoom this time, which did not provide the ‘classroom’ interface as Microsoft Teams did (Figure 5a). As an additional virtual platform of sharing and annotating, Miro was offered to the students where they could present their research and see other’s sketches, concept boards, model images, and the annotations of the studio instructors and their peers. Additionally, OpenFab produced an apparatus for the laptops that enables the students and the instructors to synchronously screen their sketching during the online critiques (Figure 5b). Although still the physicality of the maker lab was unavailable, the students kept their correspondence with the OpenFab and sought for further feedback to solve their interactive design problem.

#### 4. Discussion

The outcomes of the INAR301 studio are two-fold: the technical and representational requirements constitute one part, embodied and interactive spatial experience constitute the other (Vjas, Veer, and Nijholt, 2013). In this paper the focus is on the latter. The comparative assessment of the extended studio model is

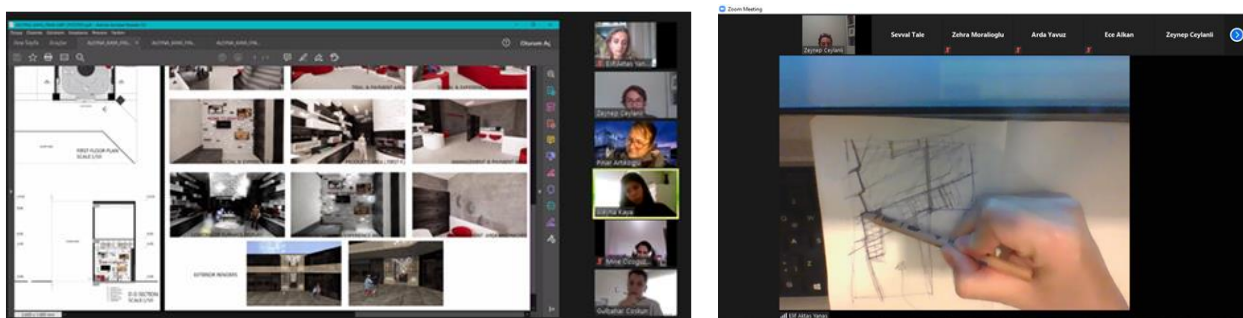


Figure 5: a) Jury and b) critique sessions in the virtual studio. (Photos by Z. Ceylanlı)

conducted according to four essential criteria based on the literature regarding the experiential retail design: embodied experience, brand identity, interactive experience, and holistic approach were sought in the students' projects (Table 2). In reference to Schmitt's (1999) experience modules, the first criterion 'embodied experience created towards design problem' seeks for the means of sensory and/or emotional experiences; whereas the second criterion 'reflection of brand identity to design and interactive experience' includes the experiences related to social-identity and culture in addition to the sensory and the emotional. The third criterion 'enhancement of interactive experience with technological and/or analogous tools' pertains to creative cognitive experiences, physical experiences, behaviors and lifestyles and is a pivotal point of the study that shows the contribution of the precedents provided by the collaboration with the OpenFab. Finally, the fourth criterion 'holistic approach towards interactive experience and spatial integration' reveals the

level of including the physical and the identity-culture related experiences.

The number of the students per semester vary from min.10 (Fall 2018) to max.18 (Fall 2020), which makes up 61 in total. Some of these students took the studio course for more than one semester. Table 1 summarizes the weekly program applied per semester and clearly puts forth the additional and lacking precedents offered throughout the face-to-face and online studio.

Table 2 shows the students who achieved the assessment criteria (AC) of the program according to the semesters that the program was conducted. In Fall 2018, the program started in the university campus, framing the learning environment within the studio and the maker lab. While 3 out of 10 students succeeded in AC1 and AC4 that semester, the AC2 and AC3 doubled this rate, and 1 student managed to accomplish all four criteria. In Spring 2019, the majority of the students succeeded in AC1 and AC2, but the numbers dropped in AC3 and

*Table 2: Comparative assessment of student (S#) projects. The bold S# indicates the student that appeared in all four criteria.*

	Total number of students in the studio:	10	12	14	11	18
#	Assessment criteria:	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020
1	embodied experience created towards design problem	<b>S3</b> , S5, S6	<b>S11</b> , S12, S14, S17, <b>S20</b> , S21, S22	<b>S23</b> , <b>S25</b> , S27, S28, S30, <b>S31</b> , S33, S33	<b>S40</b> , S43, S44, S32	<b>S46</b> , S47, <b>S50</b> , S54, S56, S58, S59, S60
2	reflection of brand identity to design and interactive experience	<b>S3</b> , S1, S5, S6, S7, S10	<b>S11</b> , S12, S13, S14, S16, S17, S19, <b>S20</b> , S21	<b>S23</b> , <b>S25</b> , <b>S31</b>	S39, <b>S40</b> , S41,	<b>S46</b> , <b>S50</b>
3	enhancement of interactive experience with technological and/or analogous tools	S1, S2, <b>S3</b> , S4, S8, S9, S10	<b>S11</b> , S14, S16, S19, <b>S20</b>	<b>S23</b> , <b>S25</b> , S27, S28, S30, <b>S31</b> , S35, S37	<b>S40</b> , S44, S32	<b>S46</b> , S47, <b>S50</b> , S61
4	holistic approach towards interactive experience and spatial integration	S2, <b>S3</b> , S7	<b>S11</b> , S14, <b>S20</b>	<b>S23</b> , <b>S25</b> , <b>S31</b>	<b>S40</b>	<b>S46</b> , S47, <b>S50</b>



AC4. Yet, 2 students covered the four criteria. In Fall 2019, although 8 out of 14 students demonstrated AC1 and AC3 in their projects, AC2 remained significantly low. The number of students fulfilling all the criteria appears as 3. The Spring 2020 semester began in the campus and the students completed the first phase learning and working in the studio and in the maker lab. However, beginning from the second phase, the students received the program online. The rates dropped slightly: 3 out of 11 students succeeded AC2 and AC3, and 1 student managed to achieve AC4. Yet 4 students provided AC1 in their project, which can be related to the first phase of the program. Still, 1 student accomplished all the criteria in their project. The fully online semester, Fall 2020, the decrease in the numbers of students in each criteria is evident: out of 18 students, 8 succeeded in AC1, 2 in AC2, 4 in AC3, and 3 in AC4. Only 2 students out of 18 covered the whole four criteria.

Beginning from the first phase until the end of the project, a thorough understanding of the brand identity and its embodied reflection to the space were under scrutiny. Accordingly, a proposal of interactive experience -whether it be supported by technological or analogous means- was expected to enhance the spatial experience. In the end, the overall project should have stemmed from a holistic approach towards design thinking and problem solving, including interactive experience and spatial integration. The fundamental alteration in the application of the program was the change of the physicality of the studio and the omission of the maker lab facilities. Thus, the student works and the field notes were evaluated from this perspective.

After the pilot study in Fall 2018, the following two semesters on campus reveal the increasing embodied experience in the student projects. Although reflection of brand identity to the space and the interactive experience increased in Spring 2019, this trend seems to decrease in the following three semesters. The first three semesters indicate that the collaboration with the maker lab has increased the use of technological and/or analogous tools in order to

enhance the interactive experience. On the other hand, the expected holistic approach shows no apparent divergence in the meantime whereas it dramatically drops down in the online studio. Between face-to-face and online studio practices, the most apparent difference is the use of technological and/or analogous tools. The decrease of this criterion can be easily attributed to the lack of physical interaction among the students and the maker lab environment (Hynes and Hynes 2018). Consequently, the decline in the holistic approach can also be tied to this fact. Because, every means the maker lab provided the students continued in all the semesters except for the lab space itself, including the model making and digital prototyping tools.

It is not easy to draw conclusions on the comparison of the embodied experience and brand identity criteria between face-to-face and online studio experience, since it may suggest a differentiation on student basis. The grades of the students are also not directly related to their fulfilment of these four criteria. This may be both due to the inclination of the students to focus on the aspects that interest them the most and/or the motivation they pursue throughout the semester. As a limitation, it is worth mentioning that the effects of the pandemic on the motivation of the students and the first-time experience of online education both by the students and the instructors are discarded in the study. However, it would not be bold to say that for both cases executing a holistic approach including space, atmosphere, identity, and interactive customer experience (Pallasmaa, 2014) remained challenging. Yet, the critical analysis conducted in this study still maintains a promising attitude towards the role of the physical space which led to a direct interaction among the students and the instructors.

## **5. Conclusion**

The implemented studio program both in face-to-face and online studio sought the extended means of the spatial experience in terms of the evolving modes of representation and use of technology which eventually would facilitate a transdisciplinary attitude towards retail interiors. As for the sake of the interior design

studio, during the studio critiques the students were repeatedly reminded of the question of experiential spatial design and the necessity to support it with technological means. Accordingly, the projects would come out with a certain sense of integrating a holistic spatial solution towards the experience and technology with regards to the fundamental and sensory elements of interiors such as light, sound, color, material, texture, etc... As the literature suggests, it is crucial to adapt to the transforming retail experience, in which the interior designer can play a significant role in terms of communicating with the user, the brand, and the product. Yet, the experience of face-to-face and online interior design studio underlined the necessity of exploring the limitations of the physical space and the means of interaction. This study initially aimed to extend the limits of the interior design studio space and eventually experienced the online studio environment. Although the immediate actions were taken to adapt to the online studio, this first experiential and exploratory study shows us that the physical interaction has still a fundamental role in the interior design studio. The counterpart of the physical interaction in online education needs more investigation. Further studies and applications of design studio practices can alter the future of not only the retail store design but also the interior design studio education.

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# The Dilemmas of Complexity in Design Studios and The Teachers' Role

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**Abstract:** Learning in design studios is a complex process that overwhelms the students and results in common mutual-misunderstandings between student-teacher. This research aims to tackle teachers' role in the design studio and explore how they can help students navigate the design learning complexities. The emphasis in learning design is primarily on students who are not aware of their learning. This puts teachers at a disadvantage, sometimes not knowing what to do or concentrating on students' learning but not knowing their teaching, or even focusing on their teaching but not aware of the importance of learning how to teach. What is the teacher-student interaction patterns that can help students get over/deal with complexities in design studios learning environments? Can building up awareness of the teachers' role help the students learn and enhance their teaching methods? The research carried out a literature review to draw a holistic understanding of the dimensions of complexities in design studios and teachers' role to solve these difficulties. It can be concluded the importance of the teacher's role in teaching design is as essential as the role of the students in learning design. Teacher-student interaction enhances the students' design learning and the teachers' design teaching. Students should be aware of their roles as learners and the role of their teachers. Agreeing with the students makes the teaching-learning journey more fruitful while students get rid of their uncertainty and be more confident.

**Keywords:** Design learning, Architectural education, Interaction, Teaching capacities, Educator's role

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## 1. Introduction

As a learning culture and design activity, the design studio's role is dominant in various educational programs in architectural departments, see Figure (1). It is an active environment; where students interact intellectually and socially in multiple activities such as; modelling, presenting and drawing. Students analyze and synthesize their ideas (Dutton, 1987). As a result of vague purposes and implicit theories, the learning environment in design studios could be complex (Schön, 1981). This ambiguity leads to common mutual-misunderstandings between student-teacher in design studios. The ambiguity lies in the discrepancies between implicit and explicit messages which confuse students.



Figure 1: Studio as a learning environment. Source: (Lawson, 2018).

Many researchers examined the epistemology of design and social relations (student-teacher) in design studios activities in an attempt to enhance the educational outcomes (Dutton, 1987; Schön, 1983; Lawson, 2018; Kolb, 2014). Ledewitz (1985) argues that this requires teachers to deal with design teaching as a design process by itself; thus, they can understand the successful means to deliver the implicit messages to students. To get over this problem; teachers should first agree on the nature of architecture and design (Beinart, 1981) and discuss it with students (Schön, 1981). Design problems are multidimensional; Archer (1979) described them as ill-defined problems while Simon (1973) articulated their ill-structured nature and Rittel & Webber (1973) stated that they are and wicked problems, see Figure (2). Design problems generally increase their complexities when moving forward to the next

design stage. Schön (1983) emphasized that students can learn design by practising it and think like architects. Design solutions should be creative to solve the complex and multidimensional architectural problems. Cross (1982) stated that students should act and think in designerly ways. The design project reflects the real-world architectural project which has changed from simple to more complex projects. Students in design studios have to deal with the complexity of architectural projects. The increasing complexity of the architectural projects and their design processes require students to use a new design process and methodologies. Highlighting design studios' uniqueness; teaching design cannot rely on one method (Ledewitz, 1985). From this point rises the need to enrich the students' learning experiences; teachers should restructure their

PROBLEM TYPE	CHARACTERISTICS	SOLUTIONS
<b>WELL-DEFINED PROBLEMS</b>	Goals known Constraints known Solutions known Success criteria known Optimal solution	The solution can be optimized
<b>ILL-DEFINED PROBLEMS</b>	Problem? Solution? Success Criteria? Multiple solutions	Solutions cannot be optimized but can be satisfactory
<b>ILL-STRUCTURED PROBLEMS</b>	No definitive problem There are many clients and decision makers A need of an orientation to look for relevant information	No definitive solution The consequences of a solution are hardly predictable
<b>WICKED PROBLEMS</b>	Incomplete, no formula Contradictory Changing Definition No stop rule Unique, no cases Solution >> a new problem Unknown/No optimal solutions	Solutions can be at most actionable

*Figure 2: Well defined, Ill-defined and wicked problems. Source: (Raami, 2019).*

cognitive schemes; practice teaching as a design process and develop new design models.

## **2. Problem Statement**

Learning is a process that merges personal and environmental experiences. It influences to acquire, enrich, or modify students' knowledge, skills, values, attitudes and behaviour. Learning in design studios is a complex process. At the heart of this process, lies the design project. The dimensions of complexity in design learning are; 1) ambiguity (vague purposes, implicit theories, and inherent conditions of inexpressibility) (Schön, 1981, 1983; Lawson 2018; Lawson & Dorst, 2013), 2) the complexity of design problem (overwhelming in scope and variables) (Archer, 1979; Simon, 1973; Rittel & Webber, 1973; Lawson, 2006), 3) design development and design moves (Lawson, 2018), 4) Design as a body of knowledge (tacit and explicit) and 5) learning environment (studio environment as a society and the hierarchy of relations) (Dutton, 1991; Savery, & Duffy, 1995). All this leads to overwhelm the students and also result in common mutual-misunderstandings between student-teacher in design studios.

This study aims to tackle teachers' role in the design studio and explore how they can help students navigate the design learning complexities. Schön (1985) pointed out that learning about design and learning to design is gained by students. Therefore, the emphasis in learning design is mostly on students who are not aware of their learning. This puts teachers at a disadvantage sometimes not knowing what to do or concentrating on students' learning but not knowing their teaching, or even focusing on their teaching but not aware of the importance of learning how to teach. The teacher's role in teaching design is not less important than the students' role in learning design. Teachers have a unique role in building students' knowledge. Teacher-student interaction may enhance the students' design learning and the teachers' design teaching. What are the teacher-student interaction patterns that can help students get over/deal with complexities in design studios learning environments? Can building up awareness of the teachers' role help the students

learn and enhance the teachers' ways of teaching? Can a new design learning experience solve these complexities or at least solve some of them (for example, restructuring the hierarchy system in design studio)?

This research believes that there is a necessary need now more than any other time to reshape the teacher-student interaction pattern. This research also aims to identify and examine teachers' essential skills to enhance the learning process by shedding new light on learning complexities. The research assumes that if the teachers were introduced to design teaching/learning theories and styles before practising teaching, it would enrich the students learning outcomes, and help them deal/overcome design learning complexities in design studios. The research carried out a literature review to draw a holistic understanding of the dimensions of complexities in design studios and teachers' role to solve these difficulties. The research started with a general description of the design studio's experience as a learning environment to construct a holistic picture of the situation. They were then followed by a discussion that focused on the complexities of design studios' to link it with the teachers' role that was reviewed in the next section to figure out how teachers can help get over each of them.

## **3. The Dimensions of Complexity**

As a learning theory, constructivism hypothesizes that students are not passive recipients of information (knowledge-acquisition). Constructivism describes that they actively construct their knowledge. Learning as a process takes place in interaction with the environment and through the reorganization of their mental structures (knowledge-construction metaphor). This interaction happens in three forms (Moore, 1989); Learner-Content Interaction or what it is called "internal didactic conversation" (Holmberg, 1986), Learner-Instructor and Learner-Learner Interaction. This research focuses on the Learner-Instructor approach as one of the different versions of constructivism. The teacher is not a knowledge transmitter. The conduit metaphor (Reddy, 1979), teacher-

student communication depends on a clear explanation of information being transferred from the teachers to the students' as a vessel. This concept should be avoided; the teacher, on the other hand, is a cognitive guide of learner's learning. In desk crits, the teacher allows students to refine their designs by pointing out the misexpressed elements and suggesting a group of modifications (Critical reflection). Students respond differently, some of them understand while others just imitate what the teacher has told them to do. At the same time, teachers act differently; some tend to impose their ideas on students, other theorize while others leave some elasticity. Figure (3) below shows the desk crits in teacher-centred approach where teachers are the only source of authority and knowledge. On the other hand, collaborative process requires the engagement of students to design a unified design process rather than each member work alone. This shift the student's role from a passive receiver into an active participant, help: 1) shaping their

personalities, 2) evolve their ideas by discussing them with their peers in the same group as shown in Figure (6).

Being involved in design projects is how students develop and obtain their knowledge. The process of acquiring knowledge increases in its complexities as they progress to university. First-year and second-year students get involved with design projects without been asked to solve complex structural problems within their project, as the senior students have to do. Even senior students have to write down their design project program. They have many flexibilities; in selecting the site, for instance, or selecting design projects from the many options that the teacher provides them. This flexibility adds pressure on them too. The last year students' task is more complicated; they had to write their own design problem and go through the journey based on their selection. The complexity here has been developed; from finding their path in solving the design problem

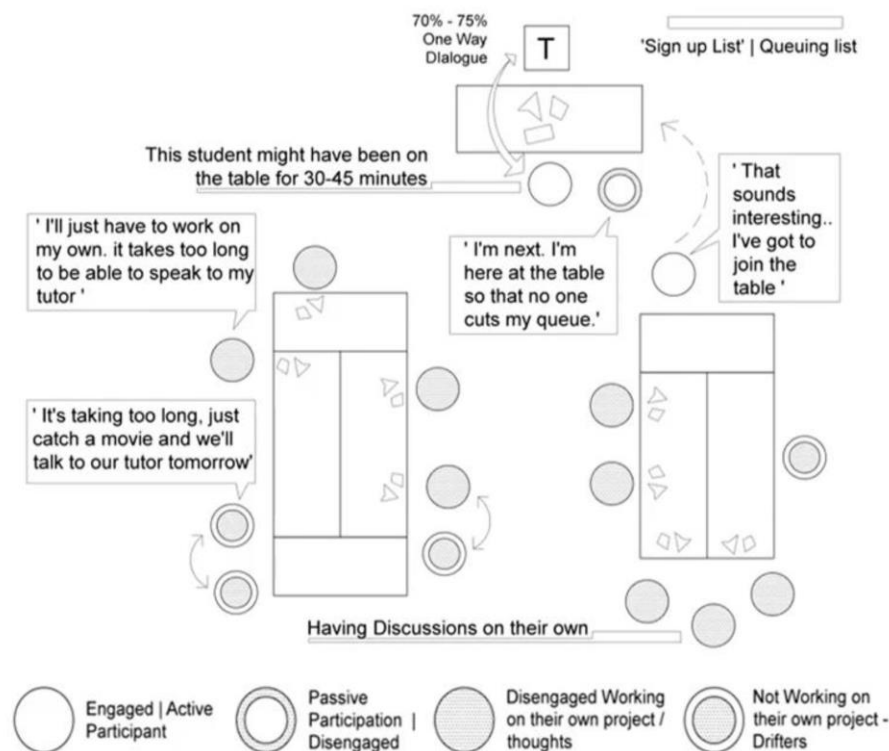


Figure 3: Desk crits in teacher-centred approach where teachers are the only source of authority and knowledge. Source: (Liow, 2020).

to compose a well-defined design problem first, and then solve it. Focusing on last year design students, the teachers' role here is very critical. Students are generally eager to impress teachers by combining many design problems, thinking that they should develop a very complicated design problem that no one has created before. Students here are stuck to a vast program and areas and enormous sites that they could not deal. This leaves no time to deal with other problems they had to solve like structural issues, site circulation, or even succeed in producing well architectural drawings. The different dimensions of complexities in design studios could be grouped as follows;

### 3.1. The ambiguity

It can be agreed that the first year of learning architecture in a design studio is the most challenging. The students do not know "what/why/how" the teacher wants them to do. At the same time, the teacher asks them to start designing. How should we start? Is there a perfect way to do this? What if our proposal was wrong? They find themselves in charge of learning; they begin to dig their own path in learning successfully. Lawson (2018) states that

students should take their own creative approach to problems from the onset of design learning. Each student produces his/her own set of solutions, Figure (4). Schön (1983) in this regard states "You should begin with a discipline, even if it is arbitrary... you can always break it open later". But it is not that easy for all students, and it varies depending on their own qualifications, characteristics and how much they are eager to learn. Dorst (in Lawson & Dorst, 2013) gave an example of one of his students who got exasperated by this during a project and came to his tutor saying "I am an engineering student. I have a right to know what the problem is". Students start designing without even being taught how to design; they start from a vague point, but cannot learn until they start (Schön, 1983). Referring to reflective learning, students must be in the middle of the design process to construct their knowledge. The problem here is more critical to first-year students introduced to new terms at the basic design course, such as been asked to express these architectural terms in 2D & 3D compositions. Students always wonder how these exercises could be linked to architecture

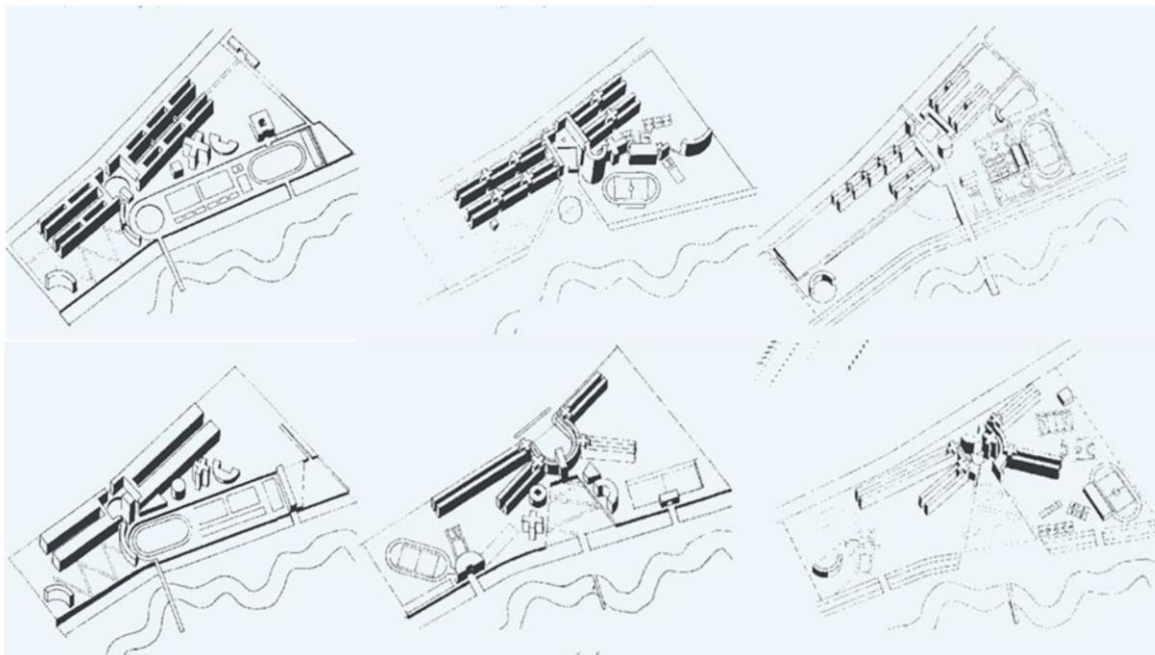


Figure 4: Abstracted 3D alternatives for the same scheme. Source: (Lawson, 2018).

wondering; aren't we supposed to learn how to build a building?

Nigel Cross (as cited in Lawson, 2018) stated that "what you need to know to design depends upon your approach to designing". There are no boundaries around the knowledge they must depend on when designing, and sometimes there is a lack of theories (Lawson, 2018). Students initiate their own set of questions and dive in the vast sources and disciplines of knowledge to get their creative solution. At some point they find themselves trapped, moving round and round at a point they put themselves at and lost the way to move on.

### 3.2. The complexity of the design problem

Design problems are multidimensional and generally grow more complex through design and while progressing in the school. Lawson (2006) articulates that design problem has no correct solution, and the design process is unending. In other words, the design problem has unpredictable and unknown solutions, and it has nothing with gaining and applying theories directly to solve the problems. If the students are given a problem to solve in a math

or a physics class, they know if they used the theories and their body of knowledge, they would come up with one single right answer that agreed with their classmates and teacher. They may choose different approaches though the result is agreed on in advance. But design problems reflect real-life problems that have many aspects that may seem complex to address and solve. The design project is more like a virtual reality version of an architectural project (Chen and Heylighen, 2006). Thus, design problems have a complex structure involving building functions and areas, functional requirements, built environment and site context (urban, cultural, social, environmental, and historical), structural systems, construction methods and other emerging issues associated with the design like sustainability, technological developments, and virtual world as well as different other components.

### 3.3. Design development and design moves

As they go through the design process, students in design projects have to create solutions, find problems, express their ideas in sketches, drawings or even models and then improve them, see Figure (5) (Lawson, 2018). While

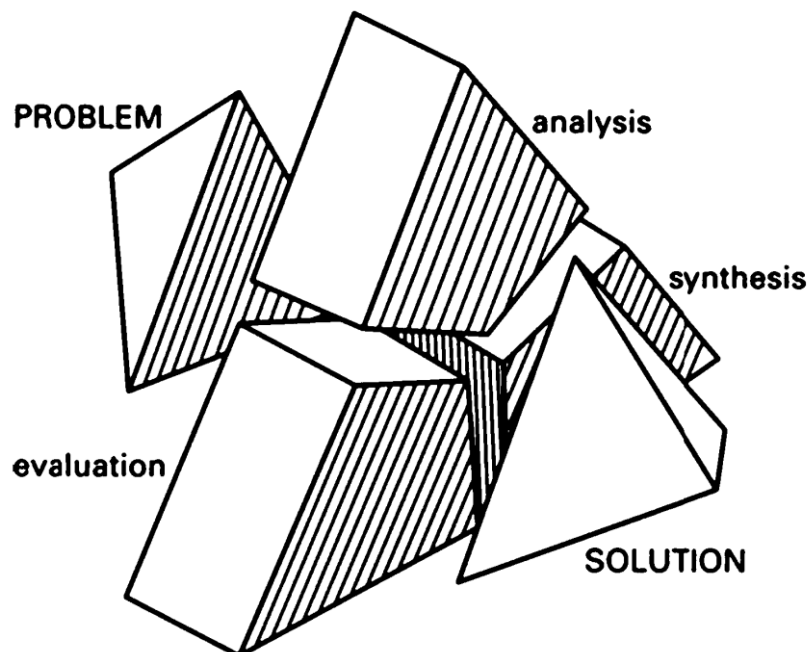


Figure 5: Design process as a negotiation between problem and solution, it is not a one-way approach.  
Source: (Lawson, 2018).

students produce creative solutions to the different design problems, they need to deal with uncertainty and decision-making based on limited information and resolve ill-defined "wicked" problems. They need to adopt solution-focused strategies, apply productive/creative thinking, and use visual or spatial media. Lawson (2018) states that designing involves finding problems as much as solving them. The cognitive conflict trigger for learning and the organization and meaning of what is learned is decided. The student should be aware of the purpose of engaging in such an educational environment, which will make them understand what context information they should develop and where, at the end of the course, they applied this knowledge (Savery, & Duffy, 1995). In teacher-student dialogues, the teacher may draw some lines and sketches to the student to illustrate his words. This dialogue includes words, metaphors, sketches, real-life examples, and constructing or deconstructing models. The teacher here does not draw a full story; s/he just gives hints as glimpses to the students. Sometimes the teacher cannot read the idea behind the students' drawings and understands them wrong. Some students could understand the main idea behind these suggestions and do them in their way while others stuck to the teachers' sketches that are not fully designed and convert these sketches to a design. Generally, this design fails because the student is imitating the teacher's lines without knowing the aim behind the disposition of a space or mass, for example, and how it relates to the whole design. In some design sections, it is easy to notice the teacher's lines in each design. The teachers are somehow imposing their ideas, and many students take these suggestions into account even if different from what they wanted to do. The reasons vary; some of them find this as the easiest and safest way to pass this journey, while others tend to please the teacher to have a higher mark.

### **3.4. Design as a body of knowledge**

Polanyi (2009) pointed out that it is possible to define knowledge as explicit and implicit. Implicit knowledge reflects knowledge based on individuals' experience. In the form of evaluations, behaviours, points of view,

commitments, and inspiration, it expresses itself in human behaviour. It is typically challenging to convey implicit knowledge in words explicitly. Sometimes, the only ways to present it are metaphors, sketches, or other communication means that do not require the formal use of language. Many experts are also unable to express what they know and are capable of and how they make their choices and come to conclusions on a realistic basis. In the expression "We know more than we can tell" Polanyi (2009) captures the nature of implicit knowledge, and further clarifies the definition in everyday examples such as the ability to identify faces, ride a bicycle or swim without even the slightest understanding of how these things are done. The bulk of the knowledge taught in school is considered theoretical, academic, and therefore explicit. Some particular forms of teaching, such as the practice (Schön, 1985), help students acquire implicit experiences that can only be held as private information. To provide students with explicit knowledge, teachers have to develop their own implicit teaching knowledge.

### **3.5. The learning environment**

Cognition in design studios is distributed, and it does not occur within the student as an individual (Savery, & Duffy, 1995). Via social negotiation and by determining the feasibility of individual understandings, knowledge develops. Lawson (2018) described the studio as a community of scholars in the sense of collaboration between students themselves and their teachers, see figure (6). The social environment is central to the growth of students' individual understanding and the formation of the body of proposals called knowledge. Collaboration is essential so students can assess their own comprehension and analyze others' understanding. In this way, they may create alternate points of view to enrich and extend their perception of specific issues (Savery, & Duffy, 1995). Dutton (1991) criticized design studios describing that they are hierarchical in their social structure, resulting in a highly competitive culture rather than what it is supposed to be (collaborative). Students tend to hide ideas, projects, and drawings from each other, thus blocking the collaboration.

Developing a competitive spirit as an educational tool may be traced back to Beaux-Arts' educational system based on studio exercises organized as a monthly competition. Competition stimulates students to do the best, but sometimes competition ends up as a tool to destroy students' collaboration. All this overwhelms the students and results in common mutual-misunderstandings between student-teacher in design studios. Authentic learning means students should be placed in an environment that fosters them to think, recall what they have learned in school, and maybe connect the knowledge they gain from different courses to be involved in real-life activities. These real-life activities are what the teachers had tried their best to prepare the students. Design studios, or maybe to be more accurate, should emphasize developing activities that

present the same type of cognitive challenges. The teacher develops design problems in the couple years of design learning, but then the students are somehow responsible for developing their own design briefs, program and problem.

### 5. The Role of the Teacher in Literature

In design studios, the teacher position is to act as an agent who encourages students to be 'empowered' by encouraging students, thus ending dominance. There are two methods of using power; coercive and constructive. Around the same time, the coercive authority should be used over others (in a constructive manner), not over others (to dominate or marginalize) (Yanar, 1999). Ellsworth (as cited in Yanar, 1999) argues that pedagogy is logically based on the premise that "all-knowing is partial, that

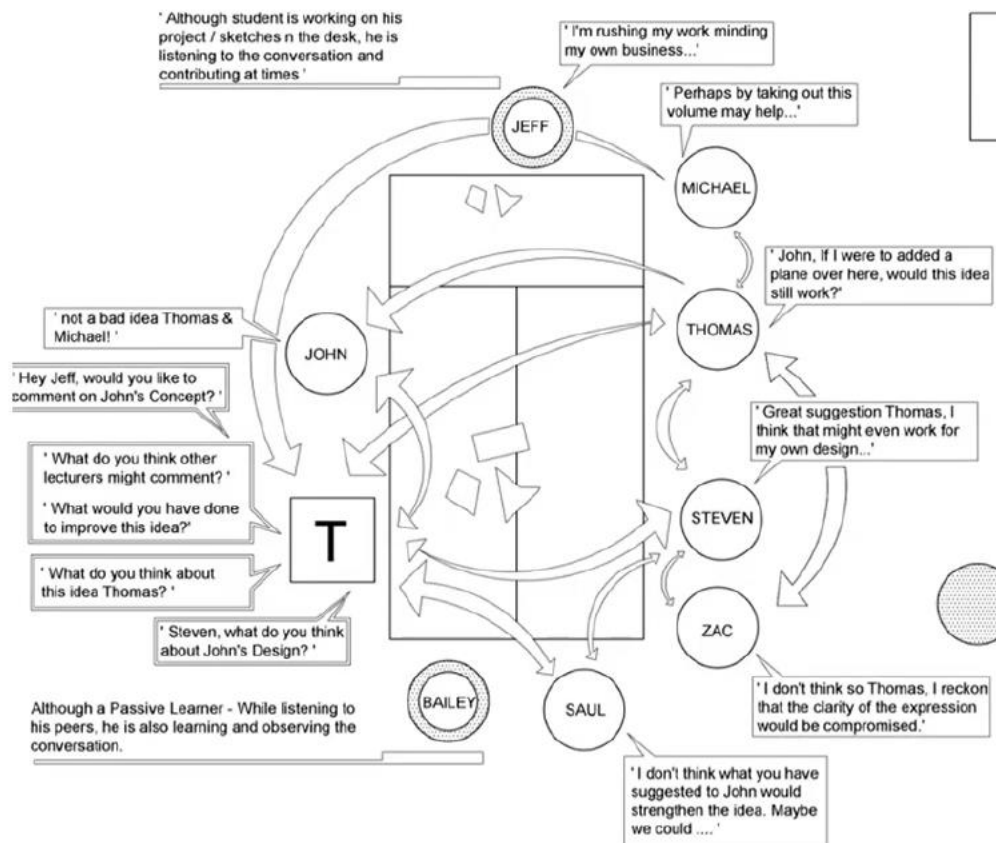


Figure 6: Collaboration in design studio between students themselves and with the tutor. Source: (Liow, 2020).



there are fundamental things each of us cannot know". The design studio has four core elements of pedagogy: the teacher, the student, knowledge and the broader context. In which knowledge development takes place after interaction between teacher and student. Information can be created and replicated between the teacher and the student, who function within the broader sense of developing knowledge, values and identities in cultural and social terms (Yanar, 1999). Lawson and Dorst (2013) identify four core features of an architectural pedagogy: the studio, the design tutorial, the crit, and the library. The education program must have the ultimate goal of motivating and allowing students to become self-sufficient (Lawson, 2018). The teacher's role is to trigger rather than passivate the student. With all his past background, knowledge, beliefs, needs, and desires, the student is invited to the learning-teaching process (Yanar, 1999). There are several roles teachers play. Some tasks may help to accomplish more than others (Lawson, 2018). Some researchers classified the role of teachers as follow;

### 5.1. Schön's studio (Yanar, 1999)

Schön positions the teacher at the forefront of teaching-learning, and s/he marginalizes the student's voice, see Figure (7). The views of Schön are linked to the pedagogical apprenticeship model, which implies certain problems, such as assigning the student a passive role and uncritical adoption of the view of the status quo. The student is "confused" in Schön's design studio much of the time, but Schön sees this as an implicit, normal and essential aspect of studio pedagogy. Schön's distinction between the teacher's positions and the student will cause problems by giving the teacher a superior position and a somewhat opposite one. As discussed on as human beings, we tend to internalize negative expectations. If the Schöns student internalizes all the mentioned expectations, Yanar (1999) challenges the efficacy of Schöns' pedagogical method in educating analytical practitioners who think independently. An impediment to a dialogical relationship is the hierarchical asymmetry between the instructor and the

learner. This asymmetry is also an impediment to reflection if the conversation is considered a reflective relationship between two or more individuals.

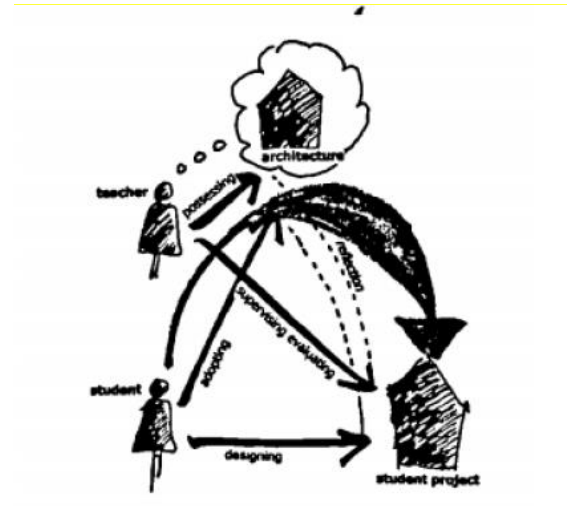


Figure 7: teacher-centred and rigid approach to knowledge construction. Source: (Yanar, 1999).

### 5.2. McLaren's (1988) classification:

McLaren identifies three categories of teachers: a. The 'entertainer': Although the teacher's rich knowledge and experience, his communication skills drive students to rely on him, preventing the intense dialogue with students. Here, the teacher stimulates shallow learning, and students will thus remain unreflective learners. It can easily notice the teacher's influence on the decision making of students' solutions and design.

b. The 'hegemonic overlord': The teacher here aims to impose unique views on the learners. This suggests that not all students will be involved, and they will not be allowed to respond to the teacher's comments.

c. The 'liminal servant': utilizing critically reflective dialogue helps the students build their knowledge. Teaching here is student-centred, enabling students to voice their thoughts, giving them valuable, constructive advice.

### 5.3. Lawson's (2018) classification:

a. The consultant role: The teacher's role here is to help with a design project, emphasizing

specific and particular design qualities rather than teaching generic issues. Students are not satisfied with their design's current state and want some advice on how to improve it. In this role, the teacher is probably working more like a senior colleague in design practice. The role of part-time studio teachers who spend their time primarily in practice is helpful.

b. The master role: Generally, the teacher here is a practice teacher, and s/he an influential designer. Perhaps the student will be fascinated to get in contact with such a teacher. In such a scenario, the teachers can press their thoughts and sometimes miss what a student tries to accomplish but cannot demonstrate strongly or entirely articulate.

c. The parrot role: Lawson makes an analogy and sees the teacher sitting on the students' shoulder squawking like a parrot to remind him of something important. The teacher's task here is to guide the student in the right direction while knowing what students want to do to make it easier and more fruitful for them to develop solutions. The teacher here appreciates that learners can learn a lot from each other and do so. It focuses on promoting, rather than conducting, discovery and learning.

**5.4. Kolb's (2014) classification:** Kolb's Educator Role Profile (KERP) theory was developed to help teachers explain the role they prefer to play in helping others learn. Their position involves their philosophy of education, teaching style, set of goals, and adopted methods to encourage learning. The teacher's role is most commonly associated with teaching in the classroom or seminars, as a supervisor, consultant, parent or friend (1) (Kolb et al., 2014).

a. Coach: Works one-on-one with learners to incorporate and improve their ongoing learning while reflecting on their work.

b. Facilitator: Provides motivations, creates personal relationships with students, fosters dialogue and self-knowledge.

c. Elevator: Objective results-oriented style, sets performance goals set and frameworks to measure earning.

d. Expert: Reflective style (authoritative), organizes the subject and provides information with lectures and texts.

By the end of the design course, many teachers passed through most or maybe all the modes. It is somehow hard to see where each task ends and starts with the next. However, the absence of explanation and articulation of teachers' positions can also confuse the student. At the end of a design project, the teachers should ask themselves what happened, their roles, and how any material collection should be treated (Lawson, 2018).

## 6. Discussion

In design studios, the teacher guides, stimulates, and motivates the students in the right way to build their knowledge. By generating responses to design problems, teachers can reflect on the students' work and explain what they are supposed to do. The main aim of feedbacks, desk crits or jury critiques is to develop the students' abilities in design. This can be achieved by the continuous cycle of revisiting design problems in design studios. Teachers ask students to explain their ideas, reason out their arguments/decisions, present their work and attend jury discussions. A variety of internal developmental processes are provoked; students may reconsider a design decision, reflect ideas on their work, rethink how to manipulate an idea, which helps them develop their own cognition. In design studios, desk crits, and jury critiques, foster students constantly reflect on their design projects due to; inner dialogue, peer dialogue, and teacher dialogue. Every week, students are asked to pin up their work and express in words what they have designed, see Figure (8). They learn from each other, how his colleague designed the composition, presented it or expressed it in terms. The teacher's role here is to suggest a new kind of move. In other words, teacher-student dialogue here may take many forms and may increase complexity. This depends on the teacher's role while sometimes unintentionally shifting roles and switching seamlessly (Lawson, 2018). In these dialogues, the teacher also helps students on how to use terms in the right position. Students pay attention to how the teacher constructs a full architectural sentence.

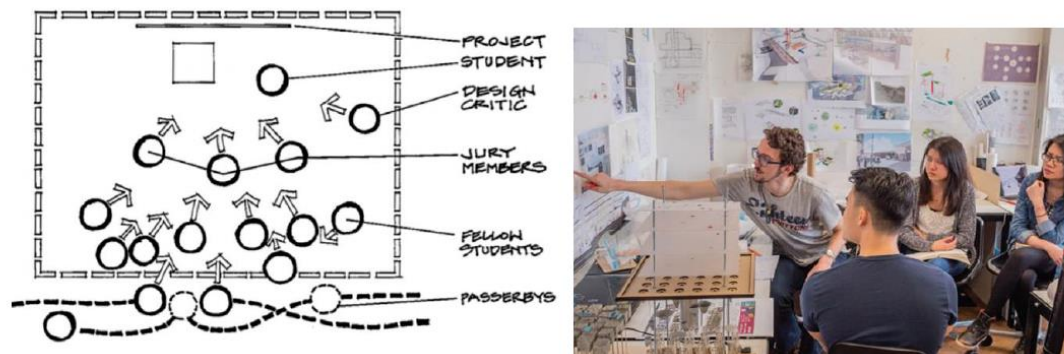


Figure 8: Design Jury Organization. Source: left (Anthony, 1991), right (Lawson, 2018).

Moreover, the teacher allows students to refine their designs and suggesting a group of modifications. As discussed earlier, the teacher must agree on the nature of architecture and design (Beinart, 1981) and discuss it with students (Schön, 1981). Here, it is essential to differentiate between reflective practice (Schön, 1983) and critical reflection (Thompson & Pascal, 2012). The first is criticized as a teacher-centred approach by Yanar (1999) and described as traditional' reflective practice by Thompson & Pascal (2012). On the other hand, critical reflection, which was based on reflective practice, is more student-centred. This approach goes beyond limitations and establishes a more firmly and sociologically informed critical reflective practice, providing a basis for emancipatory practice (Thompson & Pascal, 2012). Rapoport (1984) discussed some difficulties that affect their learning process and understanding in design studio environments. For example, some teachers tend to be subjective depending on their personal aesthetic preferences (likes and dislikes) while giving feedback instead of being based on a theory that limits their educational development. Other design teachers, implicitly and without recognizing, impose their attitudes about design (Ledewitz, 1985) this asymmetrical relation of power affects the educational process negatively (Dutton, 1987). Some students try to satisfy and appease their teacher while sometimes they try to defend their thoughts. Some students cling to essential principles in design that seem to have unbeatable odds. The teacher has to face this

situation when students are attached to specific ideas which even creates many difficulties. Another of the essential skills students must acquire is understanding when to let go of these ideas (Lawson, 2018). There are no boundaries around the knowledge students must depend on; students found themselves trapped. At this point, the teacher's role is to lead them to the escape door without giving them the keys; at least now they know their escape path. The teacher may also provide them with confidence by stepping them one step behind or ahead, so they are saved from being in a stuck-up situation. The teacher will act as the light at the end of the tunnel, and students have to fight until they reach this source of light. At least at this point, they are confident of choosing the right path, the right beginning. This will give them the much-needed motivation and energy to fight until the end.

## 7. Conclusions

Design problems as real-life problems have many aspects that may seem complex to address and solve; students need to be creative and skilled. Thus, teachers are responsible for forming new and unique methods and approaches to help students overcome these complexities and help them in mastering new skills and acquire up-to-date knowledge. Teachers should be aware of their role in teaching design and should learn how to teach design. Building teaching capacities, mastering essential teaching skills, and teaching as design by itself would enrich the teaching-learning experience. Teachers need to rethink their

teaching style, redesign their course syllabus, teaching aims, teaching methods, and desired outcomes. As a first step, they need to discuss with the students and make everything clear for them. Students should be aware of their roles as learners, what they are supposed to do, which skills they need to develop and what they will learn from this course. Building awareness of the teacher's role will help students gain their knowledge with confidence and help them deal with design learning's different complexities.

The social nature of learning distinguishes the learning process in design studios; it is instructional, conversational or rather includes dialogue. If we reflect Vygotsky's idea of the Zone of Proximal Development in design studios; it will help explain the maximization in the students' learning potentials. Vygotsky (1978) argues that students can develop their cognition in two different levels; seeking knowledge at their own (actual developmental level) and while interacting with their peers or teachers (potential developmental level). In design studios, students interact with each other in this social environment; the teacher's behaviour alters their motivation and learning process. To overcome these complexities, teaching in design studios, should be student-centred. The teacher, with his sufficient knowledge, supports, advises and gives confidence to the students. Teacher-student dialogue builds on students' knowledge. Teachers, as knowledge builders, are not the primary source of knowledge. Teacher-centred teaching marginalizes the student's voice, ends up with shallow learning, and drives students' tendency to mimic the teacher, thus breaking the reflective learning process. Teachers should not impose or press their views on the student and avoid being result-oriented. Teachers should use different means of delivering knowledge which motivate students, involve all students and facilitates their learning process.

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# Adapting to the Living Space in the First Interior Design Studio

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**Abstract:** The case study will examine online and face-to-face learning experiences of the two different groups of students who have never been enrolled in an interior design studio, where they see their classmates and encounter an “interior architecture” project as a problem for the first time. As the “living spaces” were the main problematic of this design studio, the interaction, the time management in design development, means of representation, inputs and outputs of the studio, perception of space and scale were the main parameters that differed and varied within separate learning environments, and will be read through the feedback of the students.

**Keywords:** Interior Architecture Studio Education, Living Space Design, In-studio design education, Online Design Education.

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## 1. Behind the Scenes Calculations of the First Interior Design Studio<sup>1</sup>

Interior architecture and environmental design education is a studio-based learning process that requires a certain time period and continuity within itself. In Özyeğin University’s Faculty of Architecture and Design, department of Interior Architecture and Environmental Design, the education initiates with solving living-space requirements; followed with workplaces, retail, educational, hospitality, healthcare, exhibition, food and beverage spaces; and ends with re-functioning industrial or cultural heritage spaces. The relationship between the space and occupants is aimed to be constructed with an increasingly-complex nature in the curriculum. The first studio experience of the interior architecture and environmental design students

is the architectural design studio where they are enrolled together with students in the department of architecture for the first two semesters of their academic life.<sup>2</sup> After succeeding these architectural design studios, students of the department experience the interior design studio for the first time in their second year. The instructors and the rest of the students of the department are introduced. This first interior design studio can be inevitably defined as an opportunity to help students adapt to the contexts of interior space and interior architecture, by focusing on living and dwelling space problem solving – as it is the utmost relevant context which they already know from daily basis.

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<sup>1</sup> This study will be grasping the case-studies of INAR 201 interior design studios that were given in fall and spring semesters of 2018-2019 academic year and fall semester of 2020-2021 academic year.

<sup>2</sup> The architectural design studios that are given under ARCH 101 and ARCH 102 course codes.

This study will be examining two design studio cases, each given in separate academic semesters, and presented with variable inputs: Such as the profiles of the occupants, project sites and program requirements. The first studio case that will be investigated is from the fall semester of the 2018-2019 academic year where the learning environment was the physical space of design studios in the campus. The latter studio case is the fall semester of the 2020-2021 academic year, which was initiated and completed as an online design studio.

In the first studio that we will be focusing on, students were given an imaginary load-bearing structure that is located on a steep and vegetated empty plot of a demolished traditional mansion in the district of Moda of İstanbul, Şair Nefi Street. The problem was designing an accommodation unit for expats: A single traveller and two parents who are taking care of their two children aged between 3 and 11. This unit needed to include private and semi-private/common spaces for these two types of occupant profile. Named “a short stay accommodation unit in Moda”, the studio was completed as a face-to-face design studio.

In the second studio case, students were to create an imaginary load-bearing structure and a remaining stone wall from a prior residence that was located on an empty plot in Çanakkale Babakale. The problem was to provide a living space for a craftsman, her/his partner and their children aged 8 years old, referring to these imaginary and remaining structures on the plot. The project name was “living with the craft”. The students were free to choose which craft the occupant would be busy with. Living space of a craftsman is often an interplay between the very characteristics of the act of creation and personal life (Bayraktaroğlu, 2020). The program needed an atelier/workshop, a common area for the guests and a private space for the family to dwell. The studio was completed as an online design studio.

The urgency for referring to the given imaginary structures without depending on them while “extending” from them and forming volumes using “fixed interior components” in

order to address the needs of the occupants was notified as the main “output” to the students in both studio cases. The pattern of both studios was processing through a conceptual idea that is abstract yet glimpsing a physicality. This conceptual idea was the derivation point of the design solutions of living spaces and the sub-spaces that are dependent on these living spaces, evaluated with the requirements of privately and commonly occupied spaces, extended from and referring to the given structures. Students commenced their design processes by doing a thorough research on the extent of the project and its requirements, along with the historical, sociological context of the project site, and exemplary cases within the global context. With the guidance of their research, they were expected to generate a “design idea” that would be fixed throughout their design process. The design studio problems through the education of interior architecture could only be solved with the extents and references of an abstract “design idea” which was introduced to the students in this studio for the first time: In each space, all of the components of interior architecture like the fixed and movable furniture and lighting have to be designed in unity, in light of this design idea. The designed space is aimed to be an outcome of the coexistence of the findings about the history of the space and its location, the occupant(s) of the space, the requirements of the program and the research, under the light of an “anchor” that helps to develop the individual design-vocabulary of each student. Therefore, this “anchor” which was taught as the “design idea”, becomes a habit for the students when they get into their professional lives after graduating, for reflecting a consistent story and authenticity within their design.

The acquisitions, differences and the learning outputs of the two design studios will be presented in this study: The collective one, where the studio instructor and other students are in a studio space in the campus, and, the latter where the students and the studio instructor are only engaged through the computer screen in their private spaces, mostly



residences.<sup>3</sup> The feedback gathered from interviews that were held with students will be considered within the evaluation of the study.<sup>4</sup> The interwoven form of production and evaluation, together with the perception of space, scale and conduct of representation is the fundamental clause of this first interior design studio. Therefore, the reflections of different learning environments on the living-space solutions will be shared.

## 2. Traces of the Studio Through the Dialogues: The Remaining and the Vanished

Design studios differ from standard classes due to their communication means and the nature of student learning. Cuff (1991) declares that the design studios are not solely work spaces: a design studio is a space where the living and studying activities intersect, therefore, it bears a similarity with a “home-office” approach. Studios are the spaces where both the course hours and the off-the-course hours are actively and densely used with “interaction”. The immediate transformation from a physical learning environment to a virtual one turns the studios into “classes”, as the course schedule started to define when the learning community should be online and offline.

The interviews held with the students who started and accomplished the first interior design studio face-to-face showed that the campus environment has a positive impact on their learning experience. Except the dialogues between students and the studio instructor within the studio hours, the studying hours when the students are alone with their projects or together with their peers support the progress of their project. In addition, the condition of different departments occupying the same space not only provides an environment for interchanging knowledge among the interior architecture students and the instructors, but also among those from other disciplines, which makes the studio learning environment an interdisciplinary one. Mutual occupation of the space defines the studio as an open learning

space where each participant is in a dialogue with each other. Kvan (2001) states that; students succeed in learning when they work together on a problem, therefore an online design studio offers them an opportunity to learn across the boundaries of the physical studio. However, according to the findings of this research, it is apparent that: By shifting the studio space into a virtual one, not only the interaction between the students studying different disciplines has remarkably decreased, but also the interaction between the students within the same studio became limited as the studio instructor had to orient the students to embark on a dialogue. It is known that students limit communication when they do not know and trust each other (Richardson et al., 2012; Swan & Shih, 2005; Tu & McIsaac, 2002; Kvan, 2001). Therefore, whether it is a face-to-face or a virtual studio education, it is more than natural to experience a remarkable decrease of the dialogues between the students, since it is the very first interior design studio of their academic life and they were not introduced to each other beforehand.



*Figure 1: A view from the side of the studio instructor during the online studio*

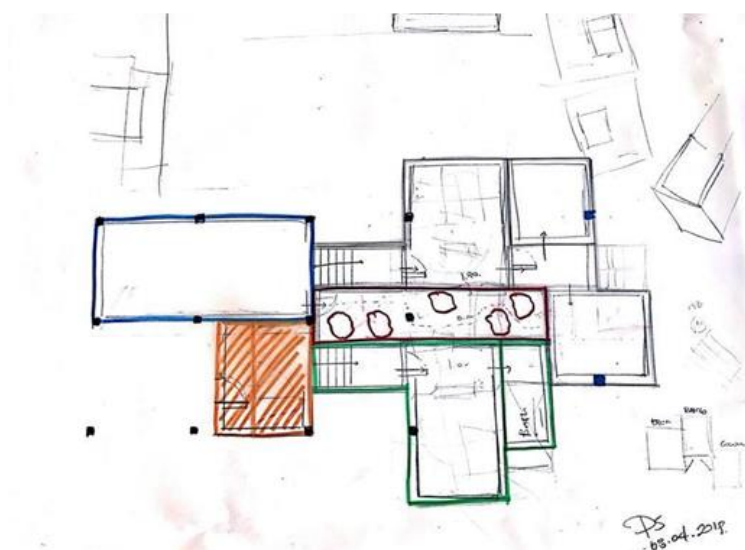
<sup>3</sup> There were rare exceptions where a few students had to connect to the online design studios from public spaces like restaurants or cafes due to problems with their internet connection, in some cases the students were connecting from the offices of their parents, if they continued working outside their home.

<sup>4</sup> The quantity of the interviewees was 22 in total, where 11 students who successfully passed each studio case of this research.

The importance of face to face communication stood out during the interviews held with the students enrolled in the studios with the two different learning environments. The bond that was created via verbal expression/language, without gestures, facial expressions and eye contact, was replaced by a high level of effort in relating the non-design-related spaces<sup>5</sup> with the design (Fig. 1). The dialogue between the student (the less-experienced junior designer) and the studio instructor faced the danger of shifting from a “reciprocally-fed” learning process to a more “didactic” one with the involvement of the screen in-between these two subjects: The producer (student) and the evaluator (instructor). Consequently, the quality of these reciprocal-feedbacks between the student and the instructor during the studio decreased dramatically. Initiating and sustaining a dialogue without the above-mentioned contacts became totally dependent on the initiative of the student. Along with the weather conditions and infrastructural maintenance, the non-verbal bond that was created in face-to-face studio education fluctuated due to the quality of the internet connection, the computer and the camera of the student and the instructor. The equal conditions

of the university campus as a democratic space for each individual became unequal and unstable, as education shifted to an extension of the “living space” or “home” where possibilities and impossibilities can be experienced together.

The interviews with the students who started and accomplished their interior design studio face-to-face (the first case of this study) showed that: The architectural drawings, sketches and mock-up design models that the studio instructor sketched, drew, scribbled, edited and used to suggest something were the most effective feedback conducts, while the students were trying to make progress with their design problems together with the other students in the same studio space (Fig. 2). During off-campus hours, while studying in their living spaces, these students had the chance to manually access these representational conducts created by the instructors: The students found it highly valuable for their design process. These easily accessible and “palpable” traces remained as drawings and the models were positive forms of learning medium, as they were the visual recordings of the in-studio critiques. Whereas, in the online studio case; the critiques were forwarded via virtual drawings on screens,



*Figure 2: Sketch traces of the studio instructor drawn during in-studio critique that was kept as a souvenir by the students (Bilge Ökten archive)*

<sup>5</sup> Zoom, Google Meet, Microsoft Teams software programs are mentioned here.



*Figure 3: A capture from the final jury evaluation of the first interior design studio*

traditional methods of verbally structured communication and brainstorming lost their functionality. The “palpable drawings and models” that were the outcome of reciprocal interaction shifted to “virtual screen images”. As a result, the feedback outputs from face to face and online studio experiences were decomposed as “analogue” and “digital”.

The distinguishing mark between the two modes of interior design studio education is the different trajectories of the dialogues: Face-to-face dialogues progress via manually produced drawings whereas the online one takes off from the screen. The praxis of in-semester studio problem solving was carried on firstly starting with sketches and then with a certain scale architectural drawing placed on a paper in the face to face studio. According to the students, this habit of manually producing representational forms has been continued in the beginning of design problem solving, even though the students pursued their latter studio praxis with computational representations. On the contrary, students in online education courses started discovering supplementary representation tools surprisingly quickly, as the prior conducts vanished with the immediate shift: This was an opportunity to make themselves adapted to today’s technology. Some research indicates that online design education can help students to facilitate their creative process and representation skills

(Broadfoot & Bennett 2003; Waks 2001). The absence of the paper manifested as an opportunity for the practice of digital representation production and the time-management of this practice. In other words, paper shifted to the screen, mockup model shifted to the virtual model.

The praxis of timing was also transformed, as the learning space of the interior design studio education shifted. Parameters, such as, the preparation time to commute to the campus from the houses or dormitory rooms and vice versa, adjusting the studying time before the critiques so there would be enough time for printing representations, were essentialities of face to face design studios (Ust, 2021). As another crucial parameter, the time management of the students who were dwelling in the city-center was especially difficult since the campus of Özyeğin University is located far from the city-center. Among the interviewed students who experienced online studio education positively the “gaining of time” via online education was emphasized. They expressed that the former time-period that they had to spend on their daily needs, including the commute, was shifted to a “surplus and valuable” time-period within which they can improve their architectural representations and make progress on their designs. Therefore, it is inevitable to agree with Saghafi, Franz & Crowther (2012) on the benefits of digital tools



as they argue that it would save costs for publishing information and presenting resources with more multimedia facilities and higher quality. On the contrary, several students stated that the studio education became much harder as they had to be in their “living space” for their education: Those students said that they could not concentrate on the design problem in their “comfort zones”, and they often found themselves enjoying quality-time activities. Thus, they pointed to a lack of productivity in their new working environments. To summarize, during the living space design problems, effective time management skills can vary according to individual characteristics, but regardless the learning environment is an actual design studio space or a virtual one.

The juries can be defined as the most crucial segment of interior architecture and environmental design education. In face to face education, juries are the open-door occasions that all departmental and/or faculty instructors and students can participate in, in which the students present their projects and get different feedback for improving their design problem solving: Therefore, juries are a collective learning experiences (Fig. 3). Symbolically important, juries are also the occasions where

the students improve their verbal presentation skills, which can naturally be defined as a rehearsal for their professional lives. The open-door mode of the juries eventually became limited due to the online education, so, the juries shifted to practices of possibilities of the occupied living spaces for both the instructor and the students (Fig. 4). The obvious contribution of the online-juries is: Invited jury members, regardless the coordinates in which they live, enrich the students’ projects with their varied opinions and comments. However, the representational sheets shifted to “pixels” where the perception of scale vanished: The architectural representations became the whole virtual image whatever could be fit onto the screen at that moment. Investigating the details of the projects on the screen required more effort and careful-attention in the online juries. Therefore, the students uploaded their presentation sheets a few days prior to the jury so that the jury members were able to examine the submissions and evaluate them before the jury. This evaluation brought the supplementary need for a short video where the students express themselves and explain their design process. The input of the jury experiences in the two different environments varies. Interviewed students often expressed a feeling of pressure to explain their projects

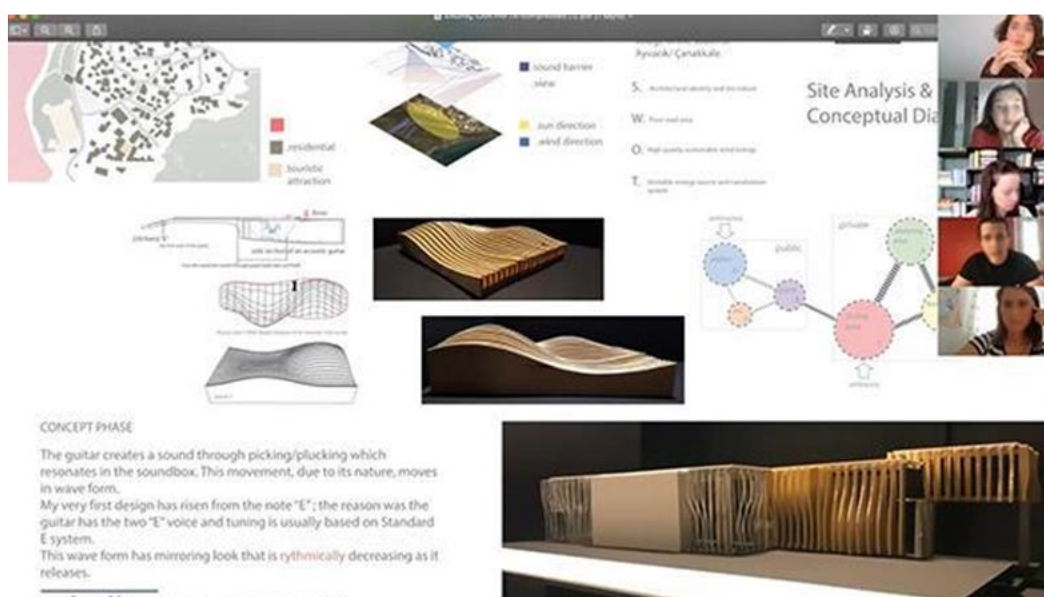


Figure 4: The online jury experience: A view from the final jury of first interior design studio of 2020-2021 fall semester



*Figure 5: Traces of the study on the project location in the online interior design studio*

effectively and consistently within a short period of time, after the long and difficult process of preparation for the juries. The feedback about uploading the pre-recorded videos for pre-evaluation of the jury members was positive, as these videos were supplementary for their online jury commentary as well. Interviewed students drew attention to the fact that these videos dissolved the possibility of being incapable of explaining the projects: The pre-recorded videos decreased the pressure of the jury experience, and helped overcome the jury stress and anxiety. To summarize, the experience of presenting the printed and organized representational sheets just a couple of steps in front of the observers shifted with the new format of juries and “momentary traces” vanished.

Interior design studios take off with research studies on the natural, historical, social and cultural patterns of the project location, in order to grasp and evaluate those issues. In the first case of this study, “a short-stay accommodation

unit in Moda” project, students made observations and analysis of the location during and after the site-visit to Moda and its environs. These observations are of the utmost importance for the project, as they are the ones which define and form the “design idea,” which is the core of the project. A photograph, a hand-drawn sketch or a voice recording taken in the project site could be the derivation point of their analysis and design idea. Whereas, in the online studio where the project was “living with a craft”, students could not visit the project site in Babakale. Relating to the project site became difficult for the students in this case. Each student tried to perceive the meaning and reality of the project location with mutual conducts<sup>6</sup>. A lack of observations and analysis pushed them to thoroughly research oral history, therefore many students constructed their design ideas and projects over a literature review (Fig. 5).

Living-space projects aim to respond to the fundamental necessities of daily life in residences. Challenging the prior knowledge of students about the dimensions within the user-and-need based volumes of daily life in dwellings, and, designing new “spatial borders” via forgetting the “coded” spatial borders in society, these projects hold a foundational place in interior architecture education. Once a place is called a “home”, it does not only address a dwelling that protects from physical conditions, it is also the place that one belongs to (Douglas & Smith, 2001). The concepts of dwelling, house, privacy and territoriality are thought through the personal and common spaces in the design progress of the projects. To initiate this process, students grasp human-behaviour – space components as a whole within the given scenarios.

The relationship between the interior components, the spaces deviated from these components and the occupants can only be evaluated with a perception of scale through basic measurements. The typology of the living space for the students was only experienced as an occupant. Therefore, they were naturally ignorant of the often-faced obstacles within

<sup>6</sup> Google maps, Yandex maps

these spaces and their awareness grew in the process of the living-space design problem in the studio. It is of utmost value for the students to relate themselves with the practice of interior architecture through the context of interior space for the first time, as the bond between the apprenticeship and the profession becomes stronger with the help of this studio experience. The issue of accomplishing the living-space design studio from their actual living space was considered an opportunity for the online studio students. While studying on their projects, the students questioned the ergonomic principles that have to be supported by anthropometric data in the actual living-space they experience at that very moment, and proposed solutions from that space they occupied. On the contrary, in face-to-face education, the students had to deal with the time-management of the “observation” of these anthropometric data of the living-space in the relatively short time period when they were occupying their homes or dormitory rooms. One of the targets of this design project was to determine the daily needs of living space for the occupant(s) and transfer the extension of these needs via measuring. Therefore, the students of face-to-face education expressed that they evaluated their living space as a laboratory of freshly-found data, dimensions, proportions and occupation modes – as the actual living space of those students was somewhere to which they arrived right after the studio study hour.

Measuring and applying the “valid” dimensions “at the very moment” of experiencing and occupying the living-space were amongst the most positive inputs of online interior design studio education, whereby the students were adapted to the virtual studio experience. Whereas in the face-to-face design studio education, more labour is needed for students to get adapted to designing the interior space components of the living-space and its needs.

### **3. Evaluation**

Design studio can be defined as the space where the uncertainty and uniqueness in design education are exposed as well as the space where the students focus on the problems that emerge, improve different ways of

understanding, reflect their personal experiences into knowledge and propose design solutions (Schön, 1985; Schön & Wiggins, 1992, Salama, 2015). Regardless of the learning environment (online or face to face); Broadfoot and Bennett (2003) identified four conditions for an effective design education: 1. learning by doing experience 2. focus on process 3. collaborative learning 4. one-to-one dialogue between instructor and student.

The living-space problem, as the very first interior design studio experience within the interior architecture and environmental design education, aims to teach the students that the interior space is related to something beyond the constructed interior components: It aims to teach that the space is only formed by the extensions of the necessary movements within the required program. Identical to the *Raumplan* solution of Adolf Loos, the needs of the interior space are addressed through thinking with “volumes”, rather than depending the interior space design solely on the plans and sections. By means of this way of design thinking, students are encouraged to re-think the coded and “already adapted” daily life activities such as, studying, sleeping, dining, food preparation, reading, laying down and taking clothes off from the wardrobe/cloth storage. In other words, students “tailor” the living space for the occupants of their projects.

Without a doubt, it is an efficient approach to initiate the design studio education with the problem solving of living space design, as it makes the students bond more with their education into the profession in Özyeğin University’s Faculty of Architecture and Design, department of Interior Architecture and Environmental Design. In the time period of solving the living space problem, we observed that some of the outputs between face to face and online education in terms of the quality equivalence were not matching. While students of online education improved the speed and practice of producing representations of their homes, they had to sacrifice the traditional on-the-paper praxis of many important conducts of architectural representation skills, such as scale, depth/lineweight and proportion. Compared to

face-to-face education where the students accomplished their design education in the studios on campus, the time management skill-learning seemed to vary per individual student in the online education.

The remaining traces from the prior critiques and juries were easily palpable, as the papers and mock-up models were manually accessible for the students in face-to-face education. This concept of palpability was another inequivalent output. On the contrary, the students, who were enrolled in the online education were fed only by the traces of a virtual pen on a screen, without witnessing any gestures, expressions, eye contacts and the hand and body coordination of the lecturer during the praxis of sketching and drawing: The dialogues were constructed in a “verbal yet contactless” form. From the beginning until the end of the “sketching” of the studio instructor, students had the chance to observe the whole experience as part of face-to-face education. Yet, the students in online education had to retain the freshness of their design-process memory with only “finished” virtual images. This condition can be evaluated as a positive outcome, as the students were feeling “pushed” to take more initiative to be in continuous contact with the instructor, and as the instructor had relatively less intervention in the design process.

Last but not least, it is of utmost importance to remember that the online education experience that has been investigated in this study is not a transformation to a virtual design studio, but a “transformation to a virtual design studio in extraordinary conditions”. Beyond all mentioned concerns, there were two main determining issues. The first one was the physical and psychological conditions of both the students and the design studio instructors, the latter was the financial possibilities and limits. Investigating via the feedback of the students within the contexts of space, time, representation and dialogue, this study underlines the importance of the prospective potential of an initially-alienated situation of many concepts and the vanished indispensability of traditional studio learning. It is an in-between designing process of making

the students adapted and not-adapted to the living space: Designing a living-space from a living-space, solving the borders of interior space through the extensions of imaginary users, learning the interior space design over the ambiguous intersection of an invisible subject yet a visible final product.

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# A Design Management and Design Thinking Approach for Developing Smart Product Service System Design: Projects from Online Industrial Design Studio

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**Abstract:** Industrial design as profession has begun to expand its scope in business practices with the recent developments in design management, design thinking, and technology. However, curricula of industrial design studio remain traditional and mainly focuses on designing products. In fact, design management and design thinking go beyond product design and expand design's scope to establishing business strategies, design innovation and service design by positioning humans and their needs at the center. Besides, the technological shift happened through Industry 4.0 enables to adapt IT hardware into systems, products and services, and make them smart and unified.

To keep up with these paradigm changes and prepare our students to the rapidly changing business environment, we initiated a Smart Product Service System (Smart-PSS) design project with the 3rd-grade students of Bahçeşehir University in the 2019-2020 Spring semester during which online education had just become a part of our lives. In this article, we present three student projects as case studies of Smart-PSSs designed in three stages as system design, product design, and interface design. As a result, students gain a more holistic approach toward the design process, acknowledge the new expansions of industrial design, and its transformative role for businesses.

**Keywords:** Industrial Design Studio, Smart Product Service System, Design Management, Design Thinking, Online Education.

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## Introduction

The relationship of design with management and technology has mutually shifted with the rise of knowledge economy. Design management (DM) has been recognized as a strategic business resource by differentiating products, managing design projects more effectively, or building brand value since the 1960s (Farr, 1965; Kotler & Rath, 1984; Cooper & Press, 1995). Recently, incline of the new

economy around Industry 4.0 paves the way for technological developments in which creativity and knowledge play a central role. Hence, design management and design thinking have become significant for the creation of new products, services, and business models to gain competitiveness in the commercial global market (Cooper et al., 2009). Within the framework of developments in design thinking, design management, and technology, we

develop and implement an industrial design studio project subject through which our industrial design education meets with these new expansions and prepares future designers to be well-equipped for future opportunities. In the 3rd-grade industrial design studio, we conducted Smart Product Service System (Smart-PSS) design project to develop viable strategies for new businesses, systems, services, and products. This paper presents three case studies of Smart-PSS design projects on different areas of design, such as tourism, health, and entertainment; after giving background information about the shifts in design management and product-service systems.

#### **Design Management and Design Thinking**

Design Management Institute (DMI, 2021a) defines the scope and shift of design management activities as follows: “[d]esign management encompasses the ongoing processes, business decisions, and strategies that enable innovation and create effectively-designed products, services, communications, environments, and brands that enhance our quality of life and provide organizational success.”

Design thinking is also defined as “a system that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business can convert into consumer value and market opportunity” (Brown, 2008, 86).

DMI (DMI, 2021b) stresses that design management has traditionally used a design thinking approach to develop compelling products and services that resonate with customers, consistently producing financial rewards, and building brand loyalty. More specifically, “thinking of design”, “thinking about design” and “thinking through design” address different types of activities within the scope of design thinking and design management (Cooper et al., 2009). While the activity of thinking about design reflects on questions of who can design and what can be designed and shifts its perspective from isolated product to a more system-wide perspective, thinking through design still in its emergence stage and has a much more profound impact on the way of the business itself is being conducted (Cooper et al., 2009). Design thinking has expanded the design activities from product to innovation and business transformation by positioning humans and their needs at the center; and led to create new visions and alternative scenarios that can give rise to new business models, organizations and strategies. Besides, design thinking has helped to raise awareness for design management upon the integration of design activities and processes in an organization at various levels. In the 2009 International DMI Education Conference, efforts in exploring design thinking in design management research generated a contextual framework (Figure 1) that depicts the shift and gradual development of design management from educational and practical perspectives.

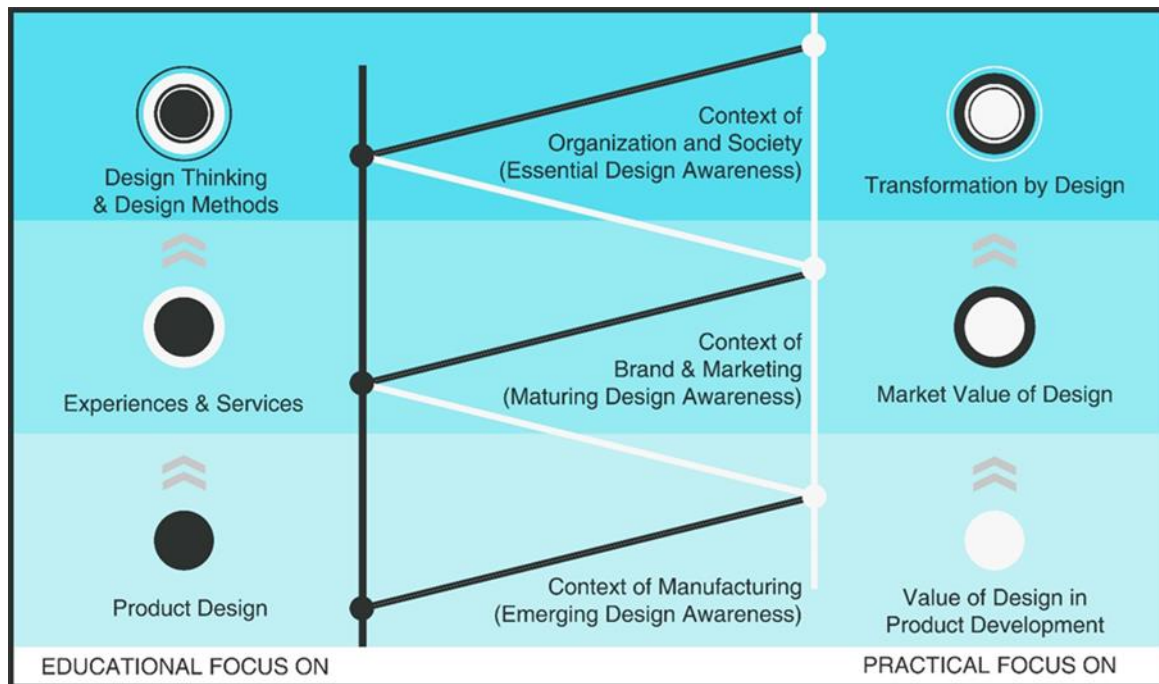


Figure 1: Integration of product design, experience and service design and design thinking in design management research (Adapted from Cooper et. al., 2009).

In the first stage (Figure 1), the implementation of design thinking in design management has initially emerged within the context of manufacturing organizations where researchers mainly focused on classic design management approaches based on product design, technology and brand. The main issues related to design management from the practical perspective can be explained as the integration of design into management processes, the value of design in product development, and the role of the designer in enhancing the communication between engineers and marketers. In developing regions and countries -such as West Europe, Asia, Russia, Turkey- and in some companies from these countries, research and practice on design management from the product design perspective are still relevant (e.g. Manzakoglu and Er, 2018). In the second context, the research and education of design management still play a role in product design within the manufacturing context, but marketing and branding broaden the scope in terms of defining a specific target group. Western Europe and North America, and the companies of these countries such as BMW, Apple, Starbucks can be the examples of this context where experience and service design

solutions are predominantly shaped around tangible products. The third and new context for the practice and research of design management embraces the organization and society, and design thinking usually focuses on the characteristics of a problem independent from a tangible product. Design thinking and design methods can be established in an organization either in marketing, design, or manufacturing with the aim of solving human-centered problems by generating scenarios and new business strategies. This thinking through design approach has been developing with the contribution of North American business schools, Design Councils of UK and Netherland, and the academic programs of EU addressing a wide range of issues from strategy to social change (Cooper et. al., 2009). In our 3rd-grade studio course, we introduced design thinking methodology to our students for them to develop new business strategies and generate scenarios around human-centered problems while keeping tangible product design aspect of the traditional industrial design education. In parallel with the paradigm shift experienced in design management with the influence of thinking through design; another shift experienced in the technology side also

empowered design and expand both its scope and practice.

### **Product Service Systems**

Industrial design is no more limited to the design of a product, or product-service systems. But, with the advancements in technology and the internet being “everywhere”, previous Product Service Systems (PSSs) turns into Smart-PSSs with an addition of small IT hardware to the products. This hardware makes the system smart, since it enables the system to gather, process, and generate data (Rijsdijk and Hultink, 2009).

In the previous product-oriented paradigm of industrial design, designers and companies accustomed to managing the system and product design in different processes of PSSs. However, on the consumers' side, there is no difference between these two and they perceive the experience as a whole. The articulation of IT hardware in the Smart-PSSs not only interweaves the system and product into each other but also led to create a consistent user experience. Moreover, the new system targets individual consumers more often and increases the value offered to them, which is also the main aim of human-centered design and design thinking. Hence, from design and technology perspectives, the focus of industrial design and designers has shifted from new product development to Smart-PSS designs in which industrial designers and students need to equip a more holistic approach to design (Valencia Cardona et al., 2013).

The contribution of design thinking to design management research and industrial design education that possesses the shift from product design to service design, and to business system design was recognized as an invaluable framework for industrial design studio practices. Many guidelines and methods have been offered to designers for managing the PSSs processes (Crul et.al., 2009; Tukker, 2015) through which designers are expected to pursue an iterative process mainly influenced by producer user interactions (Diehl and Christiaans, 2015). Throughout the iterative stages of the PSS design process, designers are

found to have been struggled in achieving cognitive jumps from abstract (service) to solid (product) level (Valencia et al., 2014). Thus, they offer designers to focus on a single stage at a time such as system, product, and service design. Following a similar approach, we structured design studio project around Smart-PSS subject and divide the design process under three sections for them to focus one part of the project at a time.

### **Industrial Design Studio Projects of Smart-PSSs**

As full-time instructors of Bahçeşehir University, in the 2019-2020 Spring semester, we initiated a Smart-PSSs project in the 3rd-grade industrial design studio with twenty-two students. In the curriculum, eight hours in a week is dedicated to design studio course and they are divided into two days, Tuesday and Friday from 8:30 am to 12:30 pm, allowing to give two critics to each student in a week. Unlike previous face-to-face studio courses, the Smart-PSSs project was initiated in an online education program due to the Covid19 pandemic outbreak which brought mainly challenges, but also opportunities in terms of setting up a communication network between students and lecturers. While experiencing online education for the first time in Adobe Connect software, we also set up a WhatsApp group with the students to enhance communication and respond to their questions readily. Hence, we achieved high level of communication with students that allows us not only to follow up their three stage Smart-PSSs process closely, but also provide a base ground for sharing design ideas and technology sources collaboratively.

Although, the focus of the project is to generate complex and integrated Smart-PSSs through design thinking with the aim of solving human-centered problems by generating scenarios and new business strategies (Cooper et al., 2009), we divided the design project into three stages as system design, product design and interface design (Table 1) to manage the process effectively (Valencia et al., 2014). At the first stage, students are expected to define a daily life problem focusing on human needs and to

propose a system solution around a wearable product by specifying all the stakeholders in the system and relations between them. We strictly advised them not to concentrate on the product or details of it by means of usage and manufacturing; however, they need to conduct research about IoT and smart technologies that will enable their system to work. The research effort on technology was focused on learning the existing technology of smart wearable products in the market such as smart rings, necklaces, bracelets, and glasses. They searched different types and sizes of Bluetooth chips, NFC modules, wireless charging batteries, vibration sensors, micro USB ports, amplifiers according to the requirements of their project concept. Selecting the appropriate components enables them to comprehend the interior dimensions and scales of their product. The second stage centralized the product and the students' decisions on the usage, dimensions, and production details within the limits of today's technological capabilities. At the last stage, they designed the graphics and the flow of the mobile phone application that supports the Smart-PSS and the interface of the wearable, if there is a screen attached to it.

which the product design stage had an impact on system design, or interface design had an impact on system and product design stages, and led to revisions. It was apparent that before the final submissions all three submissions of system, product, and interface design need to be revised repeatedly.

Within this paper, we introduce three of the nineteen submissions Smart-PSSs projects by referring them Project A, B, and C in accordance with the Student A, B, and C, respectively. By selecting those projects, our aim was to cover diverse topics as much as possible.

**Project A – A smart tracker for Resort Hotel Customers**

Student A designed a Smart-PSS for Resort hotels where family members enjoy their own time even though they go on vacation together. Especially, when it is the matter of children, parents need to know their whereabouts, like kids' club, swimming pool, etc. without sacrificing their own activities. This was the main problem definition at the beginning stage of the project and to overcome finding their

Table 1. Smart-PSS Design Stages and their duration periods

<i>Smart PSSs Design Stages</i>	<i>Duration periods of the stages</i>
1. System Design	6 classes (3 weeks)
2. Product Design	6 classes (3 weeks)
3. Interface Design	3 classes (1,5 week)
4. Final Submission	1 class
	Total: 16 classes (8 weeks)

Table 1 shows how we distributed the total eight weeks of time dedicated to the Smart-PSS into three stages; namely the system, the product and the feedback. In this process each student had a chance to experience these different scopes of industrial design individually.

Throughout eight weeks-time project duration, we experienced an iterative design process in

kids' location. Since GPS is not that accurate in multi-story buildings such as resorts; Student A offered a wearable tracker, which works with Bluetooth transmitters, for the kids. Student A planned to place Bluetooth devices at the entrances and exits of the interior places and some certain outdoor places such as pools, beach, and sports fields. Thus, parents can locate their children with an application that



Figure 2. System Poster of Project A

they have downloaded when they check in to the resort if they want to benefit from the system (Figure 2).

In the second stage (Figure 3), while Student A was working on the product, he realized that he could expand the concept for every customer in



Figure 3. Product Design Poster of Project A



the resort since sometimes couples and friends can wonder about the whereabouts of each other while they are doing different activities. Besides, people tend to carry fewer things on vacation. Sometimes even the room key and towel cards become extra stuff, they can be forgotten or lost. People are also used to wear colorful wrist tags in resorts that inform the workers about their accommodation type such as half-board, full-board or all-inclusive. On the other hand, the resort management and workers are defined as stakeholders in the system. Thus, Student A decided to combine the room key, towel cards, and the tracker in the waterproof colorful wristband that contains a Bluetooth and NFC module, a battery, and a wireless charger. The receptionist gives a wristband to each customer when they check-in. Customers are asked to download the application and pair the wristband with their phones. At the end of the vacation, they leave the wristbands at the reception desk where they can be cleaned and recharged.

At the third stage (Figure 4), while designing the application, Student A also evaluated the communication between the hotel management and the customer. He added features like

booking reservations from restaurants and sending notifications about some events like concerts, etc. In the final design of the application there were three main menus by which customer can track his/her accompanied ones; lock/unlock room; and notified about special events, track towels and sunbeds, and make reservations.

### Project B

Student B designed a Smart-PSS for doctors that can be referred to as a new generation pager. She identified the problem as the doctor just seeing the incoming caller ID from the pager and needing to make a call to learn about the emergency. In order to enhance communication, Student B proposed a wearable earpiece (smart pager) for doctors that offers the opportunity to communicate instantly with the nurse who is making the emergency call, and to learn about the patient's condition and location. The doctor also can reject the call if s/he is already busy with another patient. In the system design stage, Student B also considered the earpiece to work as the headphones of the smartphone; thus, being used by the doctor in his/her free time.



Figure 4. Interface Design Poster of Project A

In the product design stage, Student B concentrated more on the pager usage habit of doctors and conducted research with the users. She revealed that users attach their pagers to their belts or suitcases and some of them mentioned they might need a loudspeaker when their hands are busy and/or the pager is not in reach. Taking user research data as a basis for product design, Student B decided to add a loudspeaker working with a magnetic signal receiver/uploader to the earpiece. Also, the final hook-like form of the wearable is suitable to wear on the ear and to attach to their belongings. However, Student B limited the product's usage to only work-related calls.

At the last stage, she designed the application interface through which the volume of the in-ear and loudspeaker can be adjusted, and the emergency situations and locations of the patients are shared. Lastly, she added a message board to be used amongst the doctors of the hospital to increase the communication between them. Student B's system, product, and interface design submissions are as follows (Figure 5).

### Project C

Student C originated his idea on the fidgeting habit of tapping fingers on solid surfaces, while thinking about something, keeping up with the music, or just for fun. He evaluated this idea for people who would like to play instruments, anywhere and anytime they want and record it without disturbing others. At the first stage of the project, he planned to offer a wearable band for each finger that can be linked to several notes of the same instrument or different instruments. Users can make the adjustments from the phone application and hear the sound from the speaker of the phone or headphones. The product works with a vibration sensor that transmits each finger tap to notes via Bluetooth technology.

At the second stage, he researched technology and found Piezoelectric sensors that measure changes in pressure or force and convert it to an electrical charge. This technology allowed him to design a smart fingerless glove and place these sensors on the metacarpals. The main components including the battery, main power card, on/off button, and micro-USB port are

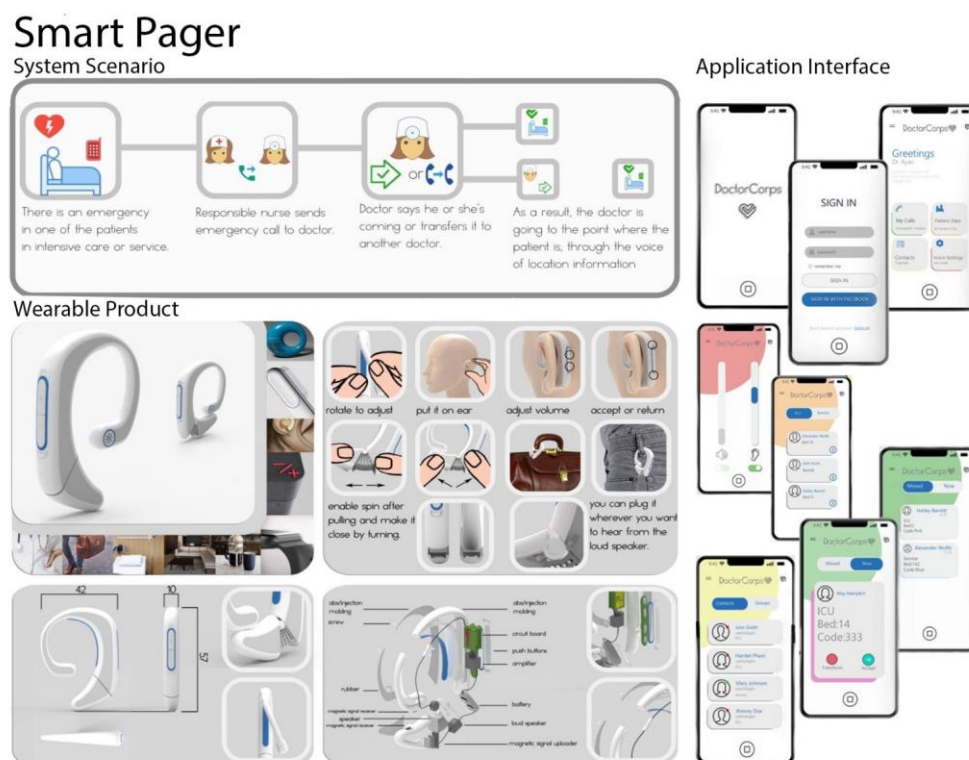


Figure 5. Smart-PSS system scenario, wearable product and application interface of Project B



located on the wrist part of the glove. Student C also added some natural sound (rain, forest, birds, etc.) features into the instrument palette.

At the interface design, he acknowledged that not all instrument types are compatible with the finger tap music creation concept. Thus, he limited the instruments, assigned to the smart fingerless glove, as percussions and piano/synthesizers. In the final design, the user can create, play and record his/her own music by tapping fingers and mix them together with the app (Figure 6).

students used design thinking methods to develop new business systems, products, services and interfaces oriented to human needs in daily life. Student A observed the needs/problems of families in big resort hotels such as difficulties in finding the location of family members, carrying towel cards and room cards,...etc. Hence, he designed a smart waterproof colorful wristband to be used as a room key, towel card, and a tracker during the vacation of families or friend groups for improving their experiences. Student B focused on facilitating the pager experiences of doctors

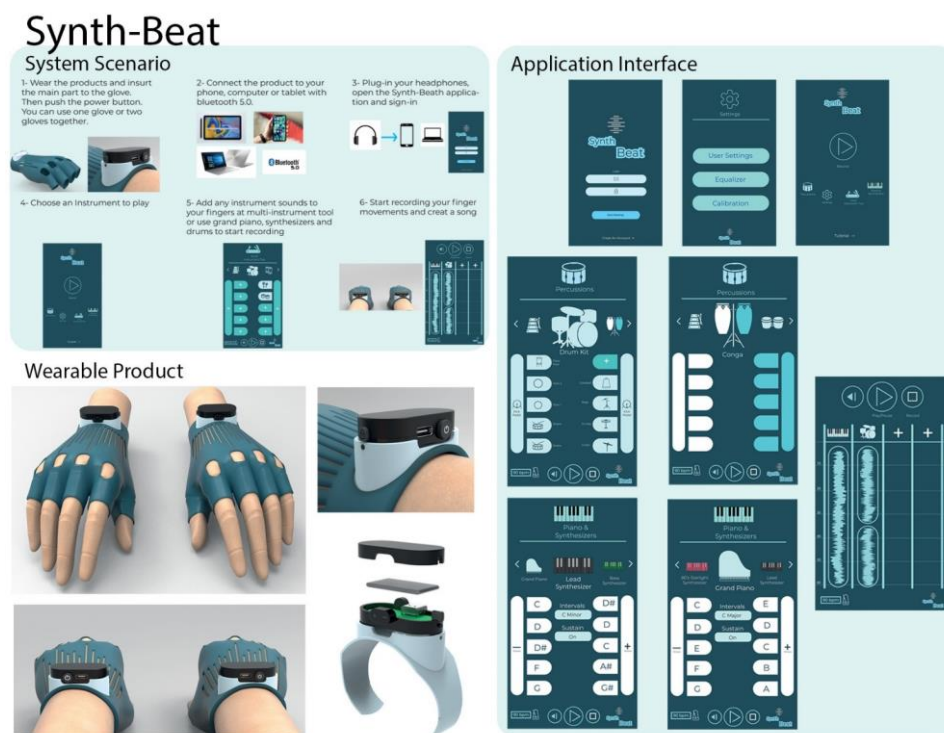


Figure 6. Smart PSS system scenario, wearable product and application interface of Project C.

### Conclusion:

The industrial design studio curriculum represented in this paper has been delicately shaped around the contemporary concepts of design thinking and design management for developing Smart-PSSs. In addition to traditional industrial design studio education, our aim is to integrate the expanded scope of design management encompassing business strategies, services, and innovation (DMI, 2021a) to the new smart technologies with the help of design thinking that mainly positions humans and their needs at the center. Therefore,

in hospitals and developed a smart pager that can be worn on the ear to listen and respond to emergency calls and instant messages. Student C has oriented to the needs of amateur musicians and designed a smart fingerless glove to be used to create, play, and record percussions and piano music by tapping fingers on a table. Building a new business system around a human-centered approach and design a product within that system increase the awareness of students towards new expansions of industrial design profession. Experiencing the paradigm shift in industrial design by

developing their own Smart-PSS concept, students gain a holistic approach toward the design process and its transformative role for businesses. Besides, the approach toward the design process was very flexible at the first stage during which students developed new business and system proposals without focusing on a product, instead they focused on humans in daily life. This aspect of the studio project differentiates the Smart-PSS design process from the traditional industrial design studio courses. On the other hand, searching, selecting, and adapting the appropriate technological components into the system and the product are found to be the most struggling issues for the students since they were not supported by IT developers or engineers. In business practices, the innovation process has become an interdisciplinary activity harboring mechanical engineers, industrial designers, user experience designers, IT developers, marketers, ...etc. Therefore, for further studies, we suggest establishing an interdisciplinary design studio concept which integrates industrial design, mechanical engineering, and information technology students and lecturers for developing new business strategies, systems, scenarios, and products collaboratively.

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# Exploring Immersive Technology for Architecture that Empowers Marginalized People: An Australian Postgraduate Case Study in Design Education

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**Abstract:** This paper examines a case study part of an ongoing PhD research at Queensland University of Technology, Brisbane, Australia. The case study investigates how architecture students can employ media architecture design with real-time-render software tools to empower people without permanent residence. As part of the assignment students developed a media architecture structure during the semester to support people who are facing homelessness. The target participants of this study were master architecture students at Queensland University of Technology. Students participated in an online survey and semi-structured interviews at the end of the semester to provide feedback about their learning experience during the master class. The data was analysed with thematic analysis. The study results explore the potential of technology to face the ongoing issues of homelessness. It opens the discussion how media architecture can be utilised to target issues such as displacement and marginalization. The results allow to refine future studio education and endeavour how to employ real-time software in a studio context.

**Keywords:** Design Education, Design Studio, Immersive Design Environment, Media Architecture, Homelessness

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## Introduction

Homelessness is one of the growing problems in all the countries around the world (Huey, 2012). Homelessness is a complex social issue in many societies as it caused by several different reasons to different kind of people. A homeless individual seeks primary night-time residence shelter homes that provide short-term accommodation (Hersberger, 2005). The Health Department of the Australian government defines homelessness into three levels (Australian Government, 2021; Chamberlain & MacKenzie, 1992):

- primary homelessness – living on the streets, in parks, in deserted buildings;
- secondary homelessness – living in temporary shelters such as refuges, emergency accommodation or sleeping on a friend's couch;
- tertiary homelessness – living in a boarding room.

Within these levels, homeless people are fronting an absence of connection with friends and family or society in general. Besides, not being able to control personal matters which can lead to physical and mental health issues (Le Dantec & Edwards, 2008). Architecture can be one of the critical enablers of our society. In this studio, we investigated how architecture can go beyond its role in society and tackle a social issue such as homelessness. The focus of this design studio was to discover solutions for people who experience impacts of marginalisation and displacement, with an emphasis on homeless people in Australia. The purpose of the imaginary proposals is to engage policy and stakeholders and the general public, to acknowledge current issues and imagine alternative futures. Students discovered opportunities without the limitation of current real-life, but by imagining how they might no longer be relevant soon. Possibilities of Roma Street and Fortitude Valley Station sites were actively explored in Brisbane, Australia.

Students identified groups of marginalised communities and specific issues that must be addressed. Projects included in-depth analysis, identification of particular problems and exploration of possible solutions. Therefore, we introduced students to the concepts of media architecture and immersive virtual design environments. In this case study, virtual reality was used with real-time rendering software and VR-headsets to investigate the design of media architecture and how media architecture can be employed to empower marginalized and displaced communities.

## Background

Media architecture can refer to build structures that incorporate media to facilitate communication with the public on an architectural scale (Brynskov et al., 2015; Dalsgaard & Halskov, 2017). Media architecture is an emerging field that continues to advance as technology enhances (Caldwell, 2016). Media architecture is usually not included in many architecture curricula (Zhigang as cited in Haeusler et al., 2012). Therefore, we introduced students to concepts to further explore, such as entertainment media architecture which are project illuminating buildings interconnected to business, retail, entertainment or commercial intentions (Fong & Chan, 2019), besides, building that include a media façade solution (Dalsgaard & Halskov, 2010) and interactive media participatory projects that empower local public engagement (Caldwell & Foth, 2014). It is challenging with traditional architectural design tools to capture the function and dynamic of media architecture. Therefore, we proposed to employ immersive technology for the design process. While other research studies such as Castronovo et al., 2017; Knowlton, 2016; Kvan, 2001; and Maher et al., 2012 explore how to implement technology in a traditional design studio context, this studies emphases on immersive virtual design environments for media architecture. It is vital to explore techniques for learning architectural

design that allow students to prototype and test media architecture proposals. The ongoing media technology development allows information to be communicated in various ways, at different scales, and in physical and digital space (Parker et al., 2018). There is ongoing research on how architects, urban planners, designers and engineers can benefit from digital media (Dalsgaard & Halskov, 2017). As a result, media architecture will continue to evolve as technology advances (Fong & Chan, 2019). Integrating digital media into architecture and urban planning will develop and potentially become more of a critical enabler of societal patterns (Caldwell & Foth, 2014). This responsibility fuels the necessity for intervention concerning this globally felt issue, such as homelessness.

### **Study Design**

This case study is the third case part of an ongoing PhD research (Jenek et al., 2020, Jenek et al., 2021), therefore, we made decisions based on our previous finding, and followed the same analysis approach. In order to compare student experience in the future. It was conducted as part of a master architecture studio in Australia from July 2020 to December 2020. The participants were master architecture students and close to graduate. Many of them were already working in architecture industry. The design studio had 37 students, who were taught by the course coordinator and the principal researcher. The study was designed as a part of a studio curriculum focusing on marginalised and displaced communities and individuals, particularly homelessness. The studio time was once a week for 6 hours during the whole semester, in which tutors provided general feedback to student project and delivered a lecture about homelessness, media architecture, and real-time-render software and design studio activities. This set up supported students to explore the design brief and research potential displaced groups to support their architecture design intervention. Students had the opportunity to design a media architecture structure as part of the building design. Figure 1 is an example of the student work at the end of the semester. The image shows a wall with a projection that allows users to express

themselves and been recognised in society. Homelessness continues to be a complex issue in society; with these prototypes, the studio endeavours exploration of solutions for people and communities who suffer from marginalisation and displacement in Australia.

The proposed projects provided an imaginary framework in each student submission targeting a different type of risk groups such as young adults, indigenous backgrounds, drug addict, chosen by each student. Each project aims to reintroduce individuals who are at risk of becoming homeless in future.



*Figure 1: Projection wall by Kate Freshwater*

Students employed a range of software tools since all of them already had at least a bachelor degree in architecture. The principal researcher has introduced design studio participants to Twinmotion (Epic Games, 2020) real-time immersive 3D architectural visualisation software for virtual reality. Some of the students used Lumion, a similar real-time immersive 3D architectural visualisation software solution (Lumion, 2021). Most students designed their projects in Revit and a few in Archicad. Both software products are common architectural drawing and 3D modelling software (Autodesk, 2021; Graphisoft, 2020). We introduced Twinmotion in more depth as virtual environment tools and media architecture concepts to students to complete a design task. Students explored their ideas with traditional tools such as physical model and drawings but also modelled their design ideas with the CAD Software. In addition, some students animated their design in real-time software or created an animated GIF.





Figure 2: Student using VR Headset, photo by the author

Most students were able to study their ideas with a virtual reality headset Oculus Rift and Oculus S, which were available during class seen in Figure 2. The Oculus Rift headset is a virtual reality system that fully immerses user to feel present in the digital realm (Desai et al., 2014). Due to the limited number of devices and COVID 19 restrictions, only a few students used this opportunity of using Oculus Rift headset.

### Data Collection

This case study paper expands on our findings (Jenek et al., 2020, Jenek et al., 2021) to further examine the impact of immersive virtual design environments in a real-world context. Since the study is part of the ongoing PhD research, a variation of Ethical clearance was submitted and approved from the Queensland University of Technology QUT Human Research Ethics Committee and complied with the requirements for a negligible or low-risk application (approval number: 1900000811). The principal researcher author communicated to participating students that critical evaluations

help improve the design studio content and student experience. The recruiting process took place in June 2020. Students were able to announce a preference between 4 different master themes, and in addition to that they could decide at the end of the semester if there are willing to participate in this research. The case study employed qualitative data collection methods such as observations, semi-structured interviews (n=8) and online-surveys (n=9) with participating students, conducted by the lead author.

### Data Analysis

The principal researcher conducted a survey, semi-structured interviews and observations during studio time to evaluate the learning experience. We employed thematic analysis to organise the qualitative data (Braun & Clarke, 2006). We following steps of 1.familiarisation with the data, 2. initial coding, 3. searching for themes, 4. reviewing themes, 5. defining themes, 6. reporting findings (Braun & Clarke, 2006). We employed Keller's ARCS motivational model to explore the *attention, relevance, confidence and satisfaction of participating students* to evaluate the learning experience (Keller, 2010). The results are presented in the following section organise through the ARCS model. The principal researcher author communicated to participating students that critical evaluations help improve the design studio content and student experience. This case study is the third case part of an ongoing PhD research (Jenek et al., 2020, Jenek et al., 2021). Therefore, we made decisions based on our previous finding, and followed the same analysis approach. In order to compare student experience in the future.

### Findings

We organised the emerging themes under the ARCS model sub-headings as follows:

#### Attention

A leading emerging theme in the data is the major interest in the field of immersive technology to tackle real-world problems such as homelessness. Students reported virtual

design environments are a valuable addition to traditional design approaches.

**Immersive design environment:** Students illustrated the advantage of an immersive experience within a real-time-rendering software and using the Oculus Rift Headset. They described this approach supported their design decisions regarding dynamic design proposal such as facade projection. Students described the immersive experience technology as appealing, but they critiqued the heavy headset and mentioned that they would not use it for a more extended time. Students explained it is beneficial to employ immersive technologies to tackle real-world issues such as homeless.

### **Relevance**

Participants emphasised the relevance of immersive technologies for their professional career. In particular, one student reported that at the beginning of the semester, the student thought virtual design environments are only an addition to the design process with traditional design tools. They reported having transformed their opinion and see a benefit in capturing the dynamics of media architecture structures, such as changing light sources, displays and moving elements.

**Previous learning experiences:** One participant explained that they had been fascinated by their peers who could produce highly realistic rendering with software tools as v-ray and critiqued that there was no design course in which they would learn about how to create thous outputs. They expressed a profound learning success after the design course in reporting that they feel more capable of achieving an appropriate visualisation.

**Identified content issue:** Research precipitants described that there sometimes was confusion between a media architecture structure and the immersive technology and the presentation expectation of the design brief. The definition of virtual design environments, media architecture and project presentation

possibilities have to be explained more sophisticated.

### **Confidence**

It has been observed that students are confident in defining media architecture and virtual design environments tools. Students express that media architecture and immersive design tools allow to make more sophisticated design decisions in some circumstances, such as more dynamic installations. The data shows that they are confident to employ in future when they believe it is appropriate.

**Learning Format:** One student critiqued the confusion about the assignment requirements. They reported it was not clear what was expected regarding the building design, media architecture and final presentation of the project. We communicated the assignment brief open for interpretation to allow students to explore the immersive technology the way they thought it would appreciate. We employed the term narrative technology, which allowed students to interpret in their individual way. It indicates to keep the design brief stricter to achieve a better learning experience. Students demanded to have more explanation for the immersive technologies tools, in addition more time to explore the digital realm themselves. Nevertheless, participants stated that most enquiries during the studio were addressed.

### **Satisfaction**

Students expressed satisfaction with their design work but highlighted again to wish to have more time to finalise the assignment requirement. They expressed to now be capable of employing a new design tool and have expanded their skill-set. Students were able to communicate their design ideas effectively with the new tools they have been introduced to during the semester. The design proposals they produced were suitable.

### **Conclusion/ Future Work**

Studies conducted, such as Gross & Do, 1999; Jenek et al., 2020; Obeid, 2019; Wei et al., 2015 state that there is a lack of research currently on how technologies can be incorporated in the

education process of architecture students learning about the dynamic properties of media architecture to address real-world issues. Through the study conducted with master students at Queensland University of Technology, educational strategies for dealing with immersive technologies in the context of the homelessness issues were explored in this paper. Through a design brief addressed by the students and their insight into their learning experiences, we could further unpack specific instances supporting exploring technologies in the design studio context. We argue in this paper that there is a scope for immersive technologies to support the design of media architecture to target real-world issues. By designing with immersive technologies, participants discovered the relevance of media architecture as a catalyst for urban life to foster and support marginalized and displaced communities. We propose designing studio education content with allows students to explore dynamic properties such as moving elements, lights and displays.

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# Adaptation of First-Year Architectural Design Studio Resources Through Accessibility

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**Abstract:** This paper aims to discuss possible adaptations of the essential resources for the first-year architectural design studio's second term under COVID-19 lockdown regulations through experiences from MEF University First-Year Design Studio. Design Studio fundamentals, such as accessibility and materiality, needed to be adapted to studio participants' changing opportunities and places. The second term of the first-year design studio at MEF University is built upon the basic knowledge gained from the first term by improving its physical aspects such as structure, material, and site by forming direct relationships with the resources through analysis and experimentation. Its adaptation to remote studio poses significant difficulties with its intense tactile and material state. New resources and adaptations to the remote studio are grouped under three categories: Curriculum, studio as a workspace, and site. Remote studio experiences are analyzed through changing resources to uncover new possible achievements. Even though there are still irreplaceable components of the regular studio structure, the paper searches for possible adaptations to overcome these challenges of architectural design studio during remote teaching by reassessment of the resources with the accessibility theme.

**Keywords:** First-year education, Remote studio, Architectural design studio, Accessible resources

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## Introduction

In March 2020 with the declaration of COVID-19 as a pandemic, design education had reached a significant crossroad with the obligation of leaving the studio space as one of the most critical components and continuing education remotely. A common studio ground has extra importance for first-year design courses to meet with other students and learn collectively. Studio space contributes to the projects by enabling physical experience, temporal and cultural immersion, specific use of material space, and learning-by-doing (Corazzo, 2019). It plays a crucial role in providing a basis for essentials of first-year education with collective productions, excursions, and experimentations.

The second term of the year differs from the first with more complex material, and site-related problems. During the second term, the need for studio space and related infrastructures increases. It becomes a critical phase of MEF University Faculty of Arts, Design, and Architecture (FADA) first-year education to meet all the learnings from the first term with additional spatial and material engagements in design projects. In recent years, projects aimed to introduce complex topographical and structural relationships with architecture and interior design students through collective site visits, material and structure experiments (Fig.1). The project objectives held holistically with consecutive empirical assignments such as

material experiments, structural studies, and site analysis. However, losing the common studio ground with pandemic restrictions

theme and formed the new agenda of the remote studio.



*Figure 1.a: Collective site visit to Bebek, İstanbul for 'Amphibian' project, 2020 Spring*  
*Figure 1.b: Structure workshop 'Bear-er' to carry maximum load possible, 2020 Spring*

precluded these collective studies and brought the need to adapt it to the changing contexts of each individual.

In addition to first-year's significant spatial bonds, MEF FADA design studios - HANGAR plays a crucial role in providing all the infrastructure for design education and hosting various instructor, designer, and student encounters (Fig.2). Studio space acts as the facilitator of the design courses. While the unifying power of the studio space played a key role in first-year education, its absence causes reconsidering the whole term structure with transferring offerings of the physical space to other resources. Since the existing term structure is highly connected to the common studio context, it was inevitable to produce a new adaptation of those resources -especially site-related- to accomplish the same set of goals and rebuild the rich atmosphere of the studio with diverse encounters, experimentations, and collective productions. Considering the reasons above, the studio's resources, which constitutes its integrity, reconsidered with the accessibility



*Figure 2. An open-jury session in MEF FADA Hangar Studio. Photo: İpek Yürekli*

### **Methods**

In design education, the studio defines not only the physical space of learning; but also a working culture, mode of teaching and learning, and program of activity (Schön, 1987). Consequently, studio space acts as a unifying space of all in the process. In pre-covid terms, the studio is based on the resources offered by the common studio space or collectively experimented at the site by excursions.

Replacement of the studio with online mediums and changing collective experiences with individual, various sites result in adaptations of the used resources and their formulation. Several resources contribute to the development of the projects. Some of them needed to be changed in adaptation to the remote studio and new ones were added. They are analyzed under three main categories according to their engagements: (1) curriculum, (2) studio space as a workspace, and (3) site. Under these categories, the paper aims to analyze reflections of these adaptations to the student projects and track their changing effects in projects. Remote studio projects will be analyzed through resources to uncover new possible achievements in research, analytical expressions, advanced spatial thinking, and drawing phases of the projects.

### **1. Curriculum**

The curriculum plays a critical guiding role in the first-year architectural design studio where students are not well-equipped to guide themselves to reach basic proficiency to undertake a design project. Projects are built step by step onto each other to reach a set of skills and develop a design perspective. In the previous years, the term was formed by three consecutive projects, each exploring material and structural natures of architecture first separately in detail and then together with combining all learnings of the semester on a collectively explored site around a specific theme.

Despite all the disadvantages of the remote studio with losing some crucial resources, the main structure of the second term curriculum is redefined to achieve a similar level of structural, material, and spatial competencies. While fixing the curriculum outcomes for the online studio, some questions arise: Which tools did students have had before? Moreover, which circumstances offered by the curriculum encouraged students to explore these tools? Besides the visible curriculum, the interwoven nature of the physical studio creates an unplanned, natural, and inevitable 'hidden curriculum'. The hidden curriculum supports the visible curriculum in the natural flow of the

studio with its rich learning environment, casual encounters, and collective studies. Without the studio, the hidden curriculum needed to be exposed and included to the visible one to recreate the studio atmosphere. Instructors are prompted to include the casual interactions of the physical studio intentionally within each project to create a more dynamic studio structure to reach the desired level of proficiency. The curriculum becomes a more layered and planned element guiding the studio.

The curriculum is revised as two projects combining all instead of three to create the gaps to insert dynamic modules without abandoning curriculum objectives: (1) Hydrophilia exploring material nature first from tactile experiments, then from remote analysis of the sites around the world, (2) Perform-X focusing on the adaptation of the given theme to local with site analysis and local information. 'Dynamic' structure of the studio is planned first with creating gaps between regular studio days to insert new workshop modules to introduce alternative topics to recreate rich encounters of the studio during the term intentionally. Second, limited screen time and interaction of students increased through the online logbooks, including their all productions to simulate the productive environment of the studio.

Firstly, in order to break the studio routine, Workshop modules by experts around the world are included in the curriculum. The studios had become monotonous due to the limited interaction provided by the static grid view of Zoom with three studio meetings a week. To break this monotonous flow and motivate the students, the introduction of diverse meetings became critical. In addition to dynamizing the static studio structure, workshops aimed to stage new encounters with the experts deliberately, which was the spontaneous activity in the studio space in pre-covid terms. Every one of two Wednesday projects are planned as workshop days; the studio hosted seven workshops in 14 weeks by experts of disciplines other than architecture. Guests are asked for lectures and daily workshops on their field of expertise under the theme of "accessible



resources". Scheduled workshops aimed to introduce coincidental dynamic encounters and their learnings existing in the studio's nature by embedding them into the curriculum. Moreover, meeting with guest experts expands the architectural curriculum by merging it across disciplines (Fig.3). As a result, the guests' variety was more incredible than ever with increasing accessibility to the world virtually.

Workshops reveal the feeling of togetherness through these intermediaries and create an inviting and exposed atmosphere. Workshops have challenged students to design and produce in a limited time, exhibit their work on online platforms, and get feedback from experts. Furthermore, they inspired students to develop a new perspective through everyday objects around their usual desks, rooms, or houses as designers.

Secondly, Logbooks as interactive sketchbooks by students are introduced to flex studio hours and expand to a timeless medium for increasing interaction between the studio participants and their works to create the virtual studio environment. Logbooks are Google Slides documents for students to document their project processes in detail which are open to the entire studio, which is an expanded portfolio rather than an archive, allowing the instructors to give feedback and follow students' productions (Fig.4). In previous terms, instructors were involved in the students' processes from their studio desks with seeing previous models and sketchbooks, resulting in comprehensive perception due to the physical environment. In the absence of studio space, logbooks became vital media for both students and instructors in order to manage the process-based nature of the architectural design studio.

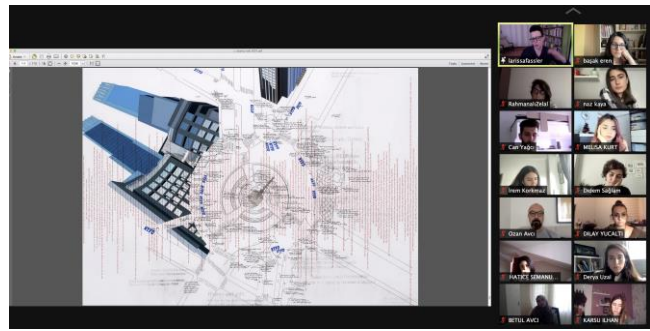


Figure 3.a: Workshop Wednesdays #7: tasaru(m) workshop by Özge Güven, April 28th 2021

Figure 3.b: Workshop Wednesdays #5: urban fabric, social fabric workshop by Larissa Fassler, April 14th 2021

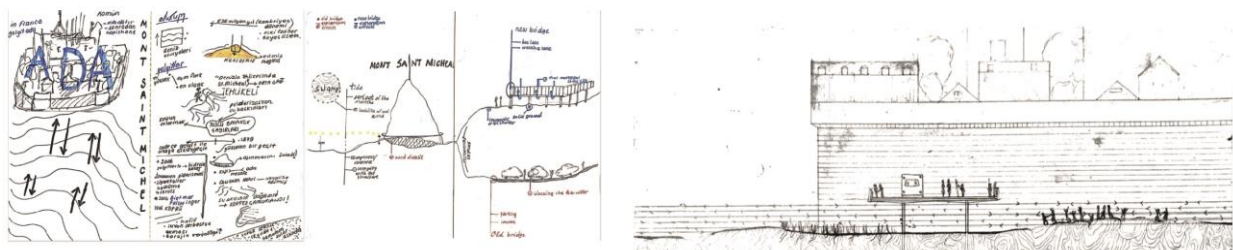


Figure 4: Pages from a Logbook: site research and drawings. Project: Ekin Nakip

As a result of the changes in the curriculum, the studio became a more structured environment to include diverse encounters deliberately. Logbooks replaced sketchbooks and studio workspaces, also used as accessible resources to create the online studio environment where students interact with each other's works. Especially for the first-year students who are new to the field, it is crucial to see more works to inspire and motivate students. Decreasing visibility and increasing isolation of the students reduced with online timeless existence and exhibition of students.

## **2.Studio Space**

The studio and campus space was undertaking the role of activating the static structure of the studio and students in regular terms. It also increases the diversity of the design discussions with different disciplines and individuals with the hidden curriculum. Pandemic restrictions precluded these possible encounters. We have experienced the importance of MEF studios, HANGAR to complement education and build a community over time. HANGAR is a 24-hour open learning place open to the personalizations of the students where multiplications of the learning channels are encouraged with its open structure. After the accessibility of this productive environment was restricted, its infrastructures needed to be transferred to virtual. Interaction between students, personalized working environments, exhibitions, laboratory spaces, equipment, materials, forums, and events are translated to Zoom environment and home resources.

The first adaptation was changing the studio structure to increase the limited interaction level of the virtual meetings since Zoom meetings remained incapable of motivating students with the pre-covid studio structure. Group structures are changed for activating students and increase even involuntary interactions. The usual group structure of the first-year studio, as approximately 13 students and one instructor paired with another group 28 people, created a more prosperous studio production, resulting in more fulfilling feedback from both instructors and fellow students.

MEF design studios have never been a hierarchical space with authoritative instructor figures; the studio acts as a collective production and discussion space with its horizontal organization. Digital medium's nature spotlighting the speaker and putting them to the center of the studio poses the risk of making instructors the avoided authority figure. The first-year students tend to seek a leading figure showing directions, trues and falses; which is an essential discussion in the design studios. The paired instructor and group system was beneficial in challenging that natural authoritative position of virtual meeting interfaces with changing the singular position of instructor, encouraging discussions, and introducing different ideas that are in the design studio's nature. As a result, all students are encouraged to raise their voices and become active players of the Zoom grid.

The second adaptation was replacing the material resources and equipment, forming the framework of the project from site and studio-specific to accessible ones. In pre-covid terms, the collective experimentation and discussions in the studio were replaced by material experiments conducted from home and with domestic resources. In previous years, physical experiments, such as building collective site models or load-bearing tests for a structure, resulted in efficient group work, also reinforced student relationships and studio culture. Similar but more primitive experiments based on accessible materials from home are also discussed on interactive whiteboards (Fig.5). Considered as alternative processes on materials and equipment provided by the studio's lab, WWs allowed a wide variety of materials to be tested. Although material diversity was achieved, the inherent efficiency, level of detail, and student interaction were not as strong as face-to-face studios. Nevertheless, the collaborative work environment is considered as an opportunity to recall this material richness into the studio.

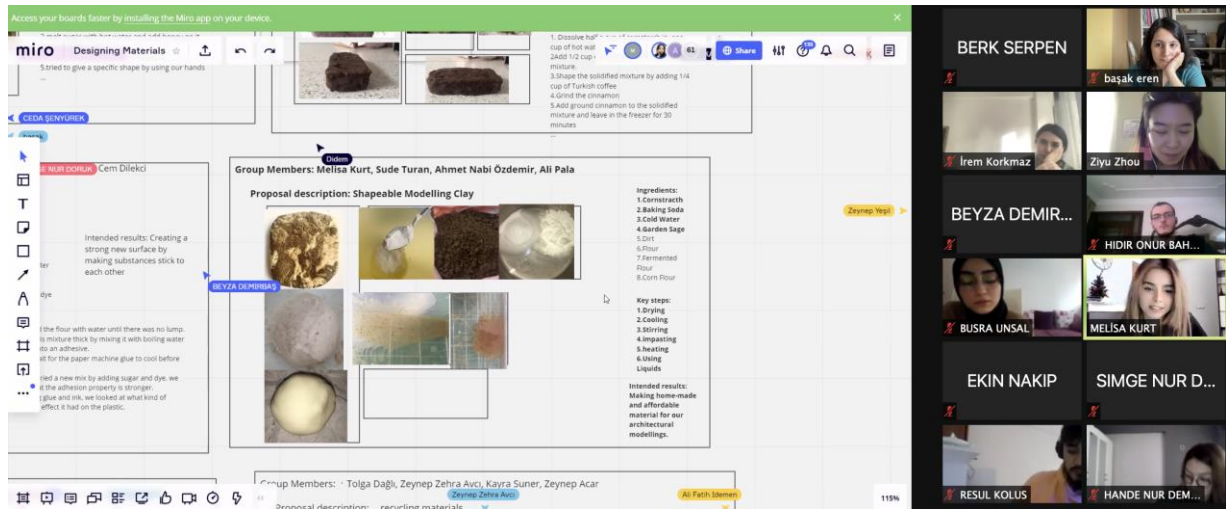


Figure 5: Collaborative whiteboard studies for Wednesday Workshop #2: designing materials by Ziyu Zhou, March 3rd, 2021

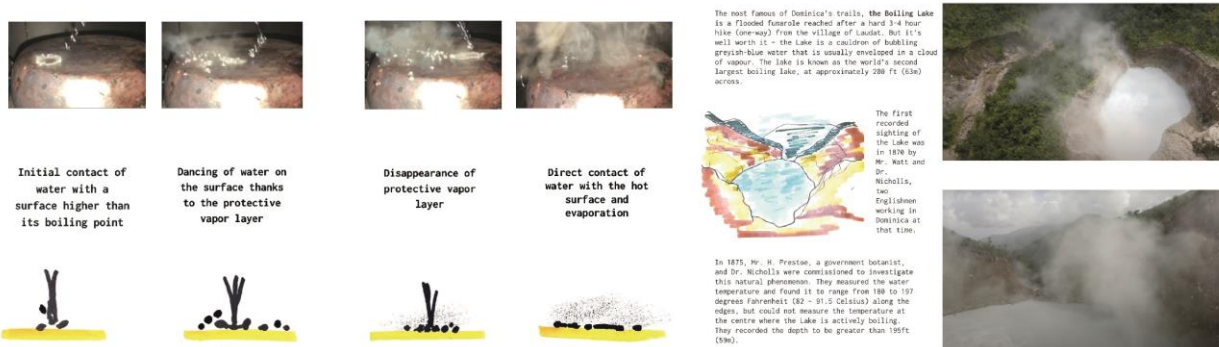


Figure 6: Water-based experiment diagram and site research. Project: Seyid Ömer Yağmurcu

During the regular term, the first project was designed as a process construction on an assigned topography at micro and macro scales with models and drawings. School's model laboratory, equipment, and various materials by the rich stationery enabled numerous material experiments and made the project effective. Without the studio's spatial resources, the project's high precision expectations left its place to personal experimentations with the accessible resources. While reformulating the project with accessibility in mind, "Water" stood out as the most accessible and controversial fundamental resource. It is introduced to the studio as an accessible, political, physical, chemical, and biological entity. Hydrophilia project focuses on water as

a "resource" in this context and developed the material research, narrative, and formation processes through it. The research continued with the site selections based on the personal researches of each student. It is aimed to design a structure using both water experiments and findings obtained from the site research. For example, a student investigates the evaporation-sublimation dynamics of water with experiments at home (Fig.6). The next stage is documenting formations using drawings and models (Fig.7). During the research phases on water, experiments with accessible and diverse materials were encouraged.



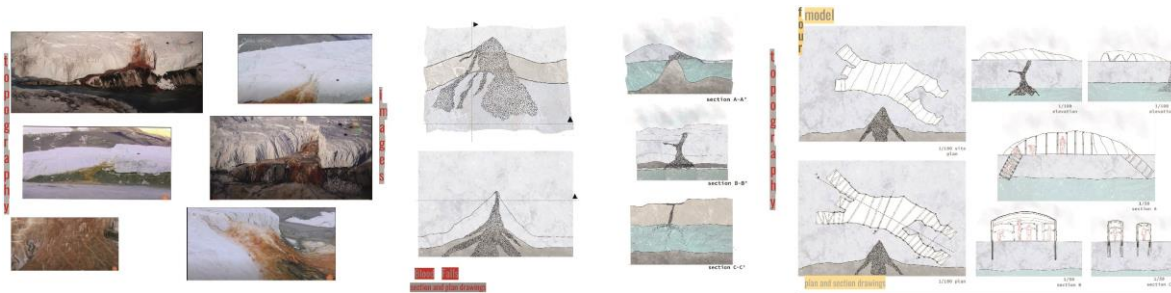


Figure 7: From left to right: Online research, site drawing and process, Research Center design. Project: Pınar Zeyrek

The third adaptation was introducing additional mediums to enrich studio productions with interactive collaboration and learning experience. In addition to the regular studio meetings on Zoom with student-instructor interactions, student-student, student-studio interactions in different mediums such as Zoom rooms, Mural, Miro, Google Slides are proposed to replace exhibition, collaboration, and discussion sessions. As a part of this diversity, logbooks also played a key role in creating continuous student interaction within the studio. Furthermore, since the simulation of the process-based nature of the studio through Zoom or whiteboards is impossible, a new medium has been proposed to reinforce the interaction. As a result, it was experienced that sharing the daily productions and jury presentations with the whole studio decreased the isolation of the students in the process. Moreover, meeting with different groups of students and working together in workshops contribute to the sense of community.

### 3.Site

Second-term projects were generally related to the research and experience of the site. Therefore the inaccessibility of the site with pandemic restrictions caused significant changes in the studio. Before COVID-19, students were expected to transform "site" information into project data using diverse methods. The dynamics of the site ranged from the dense urban area to the rural fields, and the data extracted from them formed cornerstones of the projects. Observation of the theoretical knowledge introduced by the project instructors on-site expanded the spatial layers of the

atmosphere, function, and daily life. When students step outside of studio space and activate the studio setup, they start to learn from the space itself by physical documentation such as photography and measurements, lectures from the local experts or governors, interviews with users to learn the informal history of the site. Students were encouraged to collect all the data from the site and filter it with the given project descriptions.

Contextual and material expectations of the pre-covid studio are revised from collective experiences to individual ones in order to recreate an accessible studio theme. Reevaluation of the resources manifests itself with a new "familiar" and "accessible" approach to the site for including the site experiences and its information. In order to discuss changing expectations of the studio, pre-covid projects might be analyzed in comparison: The first project, "Speculative Landscapes" had focused on forming an imaginary landscape in different scales and analysis over time. The project was held by experimental models constructed with material researches and their conceptual meanings by prioritizing the observation. The second was a structure project aiming to translate knowledge of the experienced site into an architectural realm with a detailed architectural project by discussing it with tectonic aspects. Adaptations had been proposed in order to preserve observation and experience of the project sites.

The first adaptation aims to perceive the site as a "place" more than a location for analyzing it from a distance. Hydrophilia discusses the site

with inputs from online resources. The project is started with online research regarding the chemical, biological, physical, and political properties of water, followed by experiments. Observation-based research is carried to a tangible level with experiments. Through material studies, students were able to experiment from their homes with the familiar material of water and have the chance to observe tectonic formations with various interventions (Fig.8). In the first step, students were encouraged to choose the material properties forming the site instead of a specific location. By doing so, the site is freed from location-based data and transformed into a material entity.

The next step is research and observation of the project site to analyze the water formations throughout time. The site is analyzed from different resources such as maps, videos, and research papers. Then, they are used as inputs for the projects; sequential drawings are used to analyze the transformation process of the site and water features (Fig.9). The initial project is not only a well-functioning result of the research process but also a systematic structure design (Fig.10). Remote analysis of the site precluded detailed analysis and limited the detail level with accessible maps and photographs. Therefore structural principles and site-specific adaptations of the project could not be discussed as detailed as pre-covid terms. On the other hand, the holistic approach

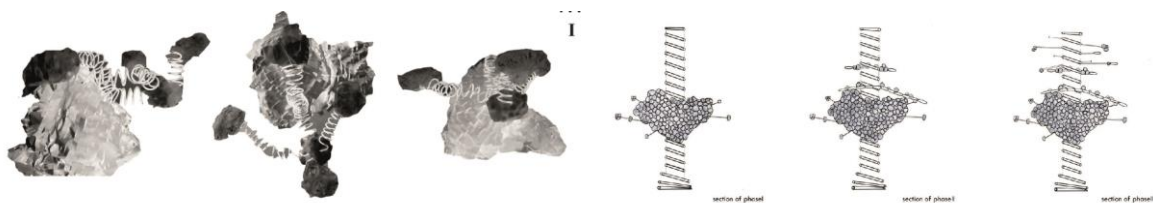


Figure 8: Phase-model of water experiment and phase-drawing of water experiment. Project: Sude Daban

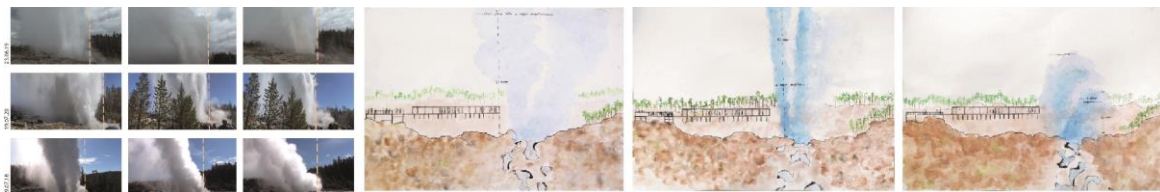


Figure 9: Temporal analysis of the geyser from videos, and design proposal according to the changes of geyser. Project: Zeynep Zehra Avcı

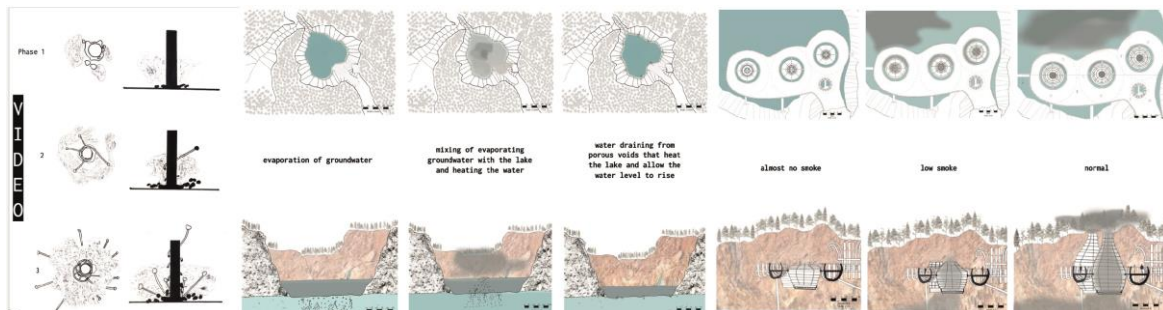


Figure 10: From left to right: Water-based experiment diagrams of formation in 3 phases, Site formation in 3 phases, Design idea formation in 3 phases. Student: Seyid Ömer Yağmurcu

of the project meeting material and structural experiments on the same project and personalization potential offers alternative approaches to the lacking context. Students were able to design a structure discussing complex spatial relationships from the accessible information and documents.

The second project, Perform-X, focuses on developing complex spatial relationships. Students are expected to design a performance space to an accessible site at a maximum 10 minutes distance by walking to their houses to replace information given by instructors with extensive knowledge of each student. The diversity of the sites and contexts uncovers various spatial and contextual relationships from rural to metropolitan areas. The project process continues similar to previous terms: students create mappings of the surrounding area where they are familiar and then interpret the theme by considering the site's unique social and historical context. Then it continued with collecting information about the site from accessible resources and their experiences and followed with the definition of the programmatic requirements of the site (Fig.11).

Accessible resources theme helped students to collect information from their own accessible sites with direct experiences; which is related with the project theme since it is subjected to the “frequented” places. Students are expected to discuss the changing usage of the area before and after lock-down. Inhabitants of the surrounding area become an important input like the students themselves. Site is analysed at a material level with both objective physical information acquired from the local authorities and also their physical experiences then transformed all into a site model (Fig.12).

While this paper is written, Perform-X is still an ongoing project. To compare the existing studio outcomes before and after COVID-19; even though the diversity of the sites produced a rich discussion environment in the studio, it was not possible to compare the different approaches to the site and detail it with other research in the studio. Moreover, familiar and accessible themes made the detailed reading and analysis of each site possible with personal filters of the students and enabled the studio to construct architectural designs on the current states of the site.

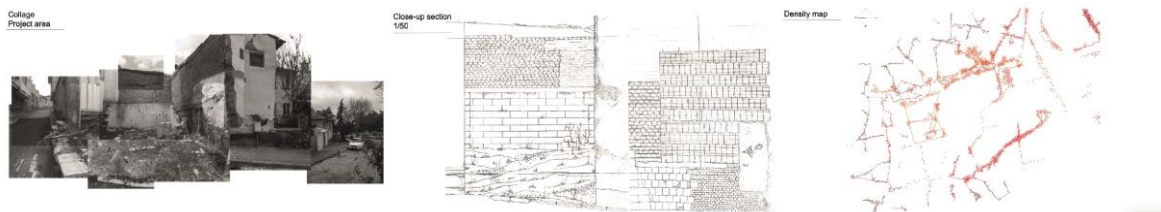


Figure 11.: Site collage, site survey drawings and mapping on the site. Student: Dilay Yücaltı



Figure 12: Site model, analysis through the site model photographs and 'Performance' program through sequences of shadow and movement. Student: Dilay Yücaltı

### **Conclusion**

Introducing new resources and adaptations to the remote studio are detailed in three categories; curriculum, studio as a workspace, and site. While all the adaptations aim to create the studio environment in virtual mediums by reassessing the tools and resources through accessibility, it also enables working alone yet together. Accessible resources shift the instructor's role from 'source of the knowledge' to 'facilitator' collecting and integrating the knowledge to the studio (Yorgancıoğlu, 2020). The instructor acts as the curator of the studio by collecting, organizing, and exhibiting the individual processes.

The first adaptation under the curriculum is including the new resources "Wednesday Workshops" and "Logbooks" which make the curriculum live, visible and shareable. The outputs revealed the significance of these intermediaries for both students and instructors to track the process. Additionally, collections of analog productions that are the primary medium for first-year students were always problematic during regular terms. Due to the inevitable documentation for communication and shared ground with logbooks, an extensive collection is created more comprehensively than ever. As a result, introducing all the natural encounters deliberately to the term program with workshops, diverse media, and mediums leads to implementing a more structured and instructor-led curriculum. Even though activating students is the primary goal, artificially creating all the enriching factors increased the share of the instructor in the studio.

Another adaptation was the reconstruction of studio structure on online platforms. The paired instructor and group system proposed as an alternative for the spotlighted-authoritative nature of online education to form equal ground and atmosphere of the design studio. Furthermore, replacing the traditional materials and techniques of the first-year studio with accessible ones enriched studio discussions. Also, their discussion and exhibition invited more channels of communication such as Mural, Miro, Google Slides in addition to the

usual Zoom environment to create a productive studio atmosphere. However, despite the increasing diversity of the discussions, the precision of individual projects remained lower than regular term expectations.

The last adaptation was related to the site. The collective observations about the site like survey and experience are needed to be replaced with accessible or familiar ones. The locational richness of the site is aimed to be introduced from different perspectives in two projects. The site's physical and material properties play a crucial role in defining specific processes of the projects through analysis of water elements in Hydrophilia project. In order to highlight the social characteristics of the site, students focused on the closest and familiar sites to their house and developed their design based on personal observations through the Perform-X project. Remote analysis of the site, precluded detailed analysis and limited the detail level with accessible maps and photographs. Students were able to design a structure discussing complex spatial relationships from the accessible information and documents. Therefore structural principles and working mechanisms of the project could not be discussed as detailed as pre-covid terms. Nevertheless, the fragmented structure of the projects enabled students to handle projects in different material and structural approaches.

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