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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.

SCOPE

Design studio pedagogy,
Design theories and methods for studio works,
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,
Fashion design studio,
New trends in design studios,
Virtual design studios,
Design thinking,
Studio culture,
Studio teaching,
Innovative and creative works in design studios
Quality assessment in studio work,
Collaborative design studies in design studios,
Integrated design studio,
Design studio practice,
Design practice,
Design research,

ABSTRACTING / INDEXING

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Editorial

Ilgi Toprak

Independent Researcher (PhD), Co-editor of Journal of Design Studio, Washington DC, USA

Editorial

First issue of the fourth volume of the Journal of Design Studio is now ready. There are six research articles, and two book reviews in this issue of the Journal of Design Studio.

The first article of this issue is "Alone in the Group; Ten Characteristics of the Live Online Critique" by Jolanda D. Morkel (STADIO Higher Education – South Africa) and Johannes C. Cronjé (Cape Peninsula University – South Africa). The article focuses on an undergraduate blended architecture studio in South Africa that allows students to work together while working with online learning engagements, on-campus blocks and office mentoring. The article advocates the basic idea that live online critique can expand the existing critical applications of the physical studio. Understanding the value and limitations of live online critiques includes insights to help educators and teachers design learning interventions appropriate for specific learning contexts to address the challenges associated with student diversity, limited resources, and the rapidly changing higher education context.

The second article, titled "Critical Reading in Architecture Education", was written by Emel Birer (Istanbul Kultur University). The aim of this study is to reveal the contributions of the architectural design studio and to prove the possibility of a method that will make these texts more understandable by including architectural texts and theory books in undergraduate education. For this purpose, a methodology proposal has been tried for the reading and understanding of texts as a part of production in architectural education. In this study, understanding, grasping and acquiring spatial behavior patterns is considered as an indicator of knowledge-based learning outcome.

Ahmet Emre Dincer (Karabuk University) and Selim Kartal (Eskisehir Technical University), are the authors of the third research article which is entitled as "Generation of Ceiling Rose Patterns by Shape Grammar Approaches in Safranbolu Traditional Houses". The article aims to examine the decorative parts of traditional ceilings, which are one of the indispensable elements of traditional residential space with their physical and psychological aspects, in terms of design methods and approaches. The ceilings of the houses in the Safranbolu region, which was chosen as the study area, were discussed. The authors defined the target of the article to contribute to the literature by offering an alternative process to the imitation and repetition of traditional architectural components and enriching the design language of craft applications.

The article which is entitled "Transferring Experience in Industrial Design Studio Education" had been written by Gizem Bodur (Atilim University) and Dilek Akbulut (Gazi University). The research subject of the article covers the different approaches of full-time and part-time lecturers in project development processes in product design studios, the professional fields and experiences of lecturers in Turkey. As a research technique, a survey was conducted with the instructors of both groups. The collected data were analyzed with the Chi-Square Independence test and significant relationships were determined between the experiences, teaching methods and design process approaches of the full-time and part-time instructors running the product design studio.

Atlıhan Onat Karacali (Istanbul Topkapi University) and Tugba Erdil (Istanbul Halic University) are the authors of the article which was focused on parasitic architecture approaches in design studio considering the sidewalls of existing building as an architectural ground. The title of this article is "Considering Sidewalls as an Architectural Ground: Parasitic Architecture Approaches in Design Studio". The main purpose of the article is to evaluate the phenomenon of architectural parasitism as a case study for the design studio. As it is known, the design studio is the backbone of architectural education, which is carried out with unique themes in every period. While sidewalls are often seen as a surface for advertisements or two-dimensional decorative arts, the design studio's results show that parasitic approaches to blank sidewalls create new codes by rearranging the surface with unexpected functions.

Rahman Tafahomi (University of Rwanda-Rwanda) is the author of the research article which is entitled as "Insight into Research Dilemma in Design Studios and Relationships with the Architecture Curriculum". The research applied the qualitative content analysis method to analyze the descriptions of the design studio modules. The finding of the study reveals that the content of the definitions of the modules is less compatible with the research activities. Despite the inductive content explanations, the analysis studies are far from a comprehensive research approach due to the missing aspects in the content of the module definitions in the curriculum. Consequently, research activity is identified as an important part of architectural education that is missing from the curriculum due to time and space. Specifically, behavioral studies, human perception and understanding, wayfinding, and well-being are common topics in many architectural departments to use surveys, interviews, observations, and focus group techniques to explore users' needs. In addition, more complex techniques such as SWOT (Strengths, Weaknesses, Opportunities and Threats), PESTLE (Political, Economic, Social, Technical, Legal and Environmental) and GIS (Geographic Information System) and simulation and animation are included in architectural research. The article states that openness to research activities is taking architecture programs to a broader horizon for the future of exploration.

The issue concludes with two book reviews which were written by Orhan Hacihasanoglu:1) **+10 Istanbul Research Workshops 2019, (+10 İstanbul Araştırma Çalıştayları-2019)** which is edited by G. Ozorhon, G. Sarman, I. Bayraktar (Eds.), and pulished by Ozyegin University Publishing in 2021; 2) **Istanbul as an Endless Space of "Urban Articulation", (Sonsuz Bir "Kentsel Artikülasyon" Mekânı Olarak İstanbul),** edited by H. Turgut, D. Mutman, N.G. Canakcioglu, I. Bayraktar, H. Tunc (Eds.), and published by Ozyegin University Publishing, in 2022.

Alone in a Group
Ten Characteristics of the Live Online Critique

Jolanda D. Morkel ⓘ
Head of Instructional Design, STADIO Higher Education, South Africa
Johannes C. Cronjé ⓘ
Professor of Information Technology, Cape Peninsula University of Technology, South Africa

Abstract: The design critique or crit, as it is commonly known, is a prominent educational practice that involves a design tutor guiding and prompting a student to develop design expertise. Although it has become a contested practice often criticized for its teacher-dominated approaches and asymmetrical power relations, it remains at the heart of architectural education. This paper is focused on an undergraduate blended architecture studio in South Africa, that allows students to study whilst working, through online learning engagements, combined with occasional on-campus blocks and office mentorship. This experiment was conducted well ahead of the recent pandemic which led to a sudden online pivot of educational spaces and practices. It explores the characteristics of the live online crit, mediated through a webinar platform. The research instruments include online surveys completed by students, graduates, and design tutors, as well as a focus group interview conducted with the graduates only. Through a thematic analysis of the data, we discovered ten characteristics of the live online crit namely that it is internet-reliant, participant-invisible, ubiquitous, media-intensive, multi-communicational, formal, accessible, work-focused, resource-saving, and inclusive. These results are timeous, given the current reliance on live online learning practices, in response to the regular need for social distancing.

Keywords: Design critique, online crit, webinar, architectural education, blended learning

Introduction

The well-established studio practice of the crit, also known as the design critique, review, seminar or tutorial, is associated with the mastery of architectural design expertise (Kuhn 2001, Voulgarelis & Morkel 2010). The crit is the conversational vehicle (Hasirci & Demirkan 2007, Osborne & Crowther 2011, Pask 1976, as cited in Laurillard 2008) through which a student learns to design, by formulating a design proposal in response to a project brief, mediated by 'a two-way conversation steered by the tutor's comments and question prompts' (Hitge 2016: 25). This happens iteratively through 'production, manipulations of, and shifts between different representational forms' (Lymer 2010:44), including language and

artifacts. The crit is considered one of the signature pedagogies (Shulman 2005) and a cornerstone component (Parnell, Sara, Doidge & Parsons 2007, Smith 2011, Webster 2004) of design education.

However, it is not without criticism. The crit is widely acknowledged for its adverse effect on student learning (Pope 2005, cited in Blair 2006, Schrand & Eliason 2012). Several authors (Anthony 1991, Hitge 2016, Mitgang 1999, Webster 2004) suggest that the design crit is 'pedagogically flawed' (Hitge 2016: 26), hindering rather than promoting learning. Quinlan, Corkery and Marshall (2007) argue that studio methodology produces teacher-dominated pedagogies and Helena Webster

(2005: 286-287) posits that students are 'coerced into reproducing staff-centred constructions of architectural habitus' and expected to display behaviour that is 'profoundly de-motivating and competitive'. It causes stress and perpetuates asymmetrical power-relations between students and tutors (Bates 2016, Blair 2006, Koch 2002, Lotz, Jones & Holden 2015, Doidge, Sara & Parnell 2004). Yet, recent studies have shown that some students and tutors (Blair 2006, McCarthy 2011, Schrand & Eliason 2012) still believe that the fear and stress associated with the design crit is necessary and an effective tool for learning. They defend the so-called 'initiation ritual as part of their identity as architectural and design students' (McCarthy 2011: 27).

These dilemmas are even more pertinent in the context of a global higher education (HE) landscape of 'worldwide growth and increasing demand for access to HE, changing learner demographics, the need for changes in cost, affordability and economic models for HE' (Cronjé 2016: 135); and in the context of a developing country where 'the relevance of current HE structures is questioned through student protests and decolonisation of education practices is called for' (Gachago, Morkel, Hitge, van Zyl & Ivala 2017:1). Whilst pervasive access to digital technologies (Cronjé 2016) have dramatically transformed our life and work, technology uptake in HE has been limited and slow (Ng'ambi, Brown, Bozalek, Gachago & Wood 2016), until the recent sudden shift to online and remote learning brought about by the Covid-19 Pandemic. This is no less true for architecture education (IUA 2017), where an over- reliance on synchronous online engagements led to 'Zoom fatigue' - a practice that deserves further investigation (Banou & Tahsiri, 2021; Morkel et al., 2021).

The programme that forms the focus of the study is the part-time bachelor's degree in Architectural Technology (Applied Design) that was offered by the Cape Peninsula University of Technology (CPUT) through collaboration with the South African Institute of Architects' (SAIA) Open Architecture, from 2014 to 2019 (Figure 1).

Figure 1: 'Open Architecture: students studying architecture in different cities together'. Tagline and graphics designed by students for a graduate exhibition (Photos: J Morkel).

The first two-year blended part-time programme in architecture in South Africa was launched in 2014 to enable working practitioners to upgrade their qualifications through a blend of office-based mentorship, on-campus blocks (Figure 2), and online learning. Mature students are based in architectural workplaces spread across South Africa and neighbouring countries, Namibia, Zimbabwe, and Mauritius.

In this paper we explored a prominent online component of the blended programme, namely the webinar-mediated synchronous live online crit. Ten characteristics were identified, namely that it is internet-reliant, participant-invisible, ubiquitous, media-intensive, multi-communicational, formal, accessible, work-focused, resource-saving and inclusive. We suggest that the live online crit, as part of a blended learning design, can address some of the challenges presented by the traditional crit, and help to enrich current crit practices, as called for by McCarthy (2011) and others, towards expanding the design studio.
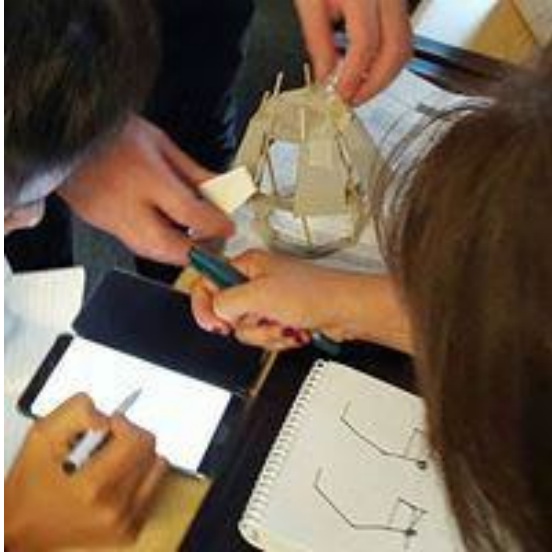
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Figure 2: *On campus face to face session employing multiple media (Photo: J Morkel)*

Methodology

The purpose of the study was to explore the live online crit, to formulate the main characteristics as reported by the tutors, the 2015 graduates and the 2016 year 1 and year 2 students. The instruments that we used, were a 90-minute focus group interview with members of the graduate group (A - E), online surveys of tutors (T1 – T5), graduates (G1 – G5) and students from both cohorts (S1 – S23). These instruments showed us what characteristics the participants experienced in the live online crit and reflected in their views on the crit setting. Although the online surveys provided a broad perspective of graduates', students' and tutors' views, the rich narrative data was found in the focus group interview with recent graduates. The semi–structured questions were borrowed from Bernadette Blair's (2006) doctoral thesis on the formative critique. The focus group comprised of one student from historically disadvantaged groups (HDGs) (Republic of South Africa, 2019), out of a group of five students, which includes one female. The interview was conducted face to face and on campus, so only Cape Town students could participate. The graduate cohort of 13 is made up of 7 HDG (all male) students, which means that 38% of the graduates participated in the focus group interview, including 100% of the females, and 14% of the HDG students. The study forms part of the first author's doctoral research and ethical clearance was obtained through the University ethical committee.

We conducted an in-depth exploration of the live online crit as a bounded activity (Yin 2008, cited in Creswell 2012), based on extensive data collection (Creswell 2007). The focus group interview was recorded, transcribed and thematically analysed using Atlas.ti v7. The online surveys were administered through Google forms, thematically coded and manually analysed. The phases of thematic analysis employed (Braun & Clarke 2006:84), included familiarizing ourselves with the data through reading and rereading of the transcribed data. Next, initial codes were generated of significant features of the data, collating data relevant to each code. The following phase was to search for themes by collating codes into potential themes, gathering all data relevant to each potential theme. The final stage, before producing the report, was to define and name the themes, generating clear definitions and names for each theme.

The first author is the University coordinator of the part-time programme and to perform this research, she acted as participant observer. This means that a degree of subjectivity was inevitable. However, it equipped the authoring team with valuable perspectives and insights. Verification strategies include triangulation using multiple data sources namely a focus group interview and online surveys; and peer review by a colleague not involved in the programme, who checked the research process and coding samples.

The live online crit via Webinar

Although a lot has been written about the impact of digital technologies on the generation of architectural CAD visualization, there is limited literature on the impact of technology on the studio learning environment and the characteristics of crits conducted in online settings (Webster 2005), especially synchronous (live and real- time) sessions. There's limited precedent and empirical research to guide tutors on the use of live online technology for learning and teaching (Ochsner 2000 as cited in Oh, Ishizaki, Gross & Do 2013,

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Lowenthal, Dunlap & Snelson 2017) to enhance learning.

The term 'webinar,' is derived from 'web-seminar', and it is a synchronous online presentation, seminar, lecture or workshop that comprises visual and audio components. Hsu and Wang (2008, cited in Zoumenou, Sigman-Grant, Coleman, Malekian, Zee, Fountain & Marsh, 2015) reported five advantages of using webinars. Webinar tools are affordable, enable synchronous communication, facilitate real-time multimedia demonstrations, facilitate multilevel interaction, and provide an environment in which participants can archive seminar content for personal review or for people who missed the real-time session.

The live online crit on which this study is based, forms part of a series of online learning experiences, facilitated in formal and informal online spaces, both synchronous (real time) and asynchronous (over time). Social and informal online platforms are set up in Facebook and Pinterest, and student-only WhatsApp year groups serve as private back channels. A SharePoint site, referred to by the students as 'the portal', contains organisational information such as study guides, institutional rules and regulations, a calendar, and announcements. Learning content is provided through interactive project briefs, recorded lectures, class notes, and video and text-based resources. The portal also houses student assignment uploads, online written and graphic feedback by tutors, records of student grades and online crit recordings. Google documents, linked from the portal, host ongoing individual student design journal updates, for feedback by tutors, in written and graphic formats.

Students meet in groups of about ten per one-hour session, with one or two tutors present in a virtual GoToWebinar space (Figure 3). The day before the session, the students are required to upload their work in pdf format, to the portal. A webinar link is sent to all participants by e mail and access to the session can be gained using a PC, laptop, tablet, or smartphone, with a headset. To save time, the lead tutor shares the student work on her screen, visible to all crit participants, and the student whose work is being reviewed, directs the tutor to advance the slides as needed. The webcam is not used. Students and tutors are given virtual pens of different colours to point and create on-screen markings and diagrams on the work displayed on-screen.

The webinar text chat is used for comments, written input and feedback by students and tutors, and to share links to support material, including blogs and websites. The online crits are automatically recorded and made available to students to view in mp4 format, soon after the crits are concluded.

Characteristics of the live online crit
The following ten characteristics of the live online crit emerged from the data.

- Internet-reliant

The live online crit relies on power and internet connectivity. Students and graduates identified the risk of losing internet connectivity in some locations and during certain times, for example because of load shedding:

> *The only disadvantage [of the live online crit] is the reliance on technology, because if there is load shedding, then crits are impossible, where as a face to face [it] may have still been possible provided the work was printed out in time. (G6)*

This supports the literature that suggest that technical difficulty, slow network transmission and speed, poor audio and loss of internet connection, negatively impact synchronous online sessions (Ng 2007, Hsu and Wang 2008, cited in Zoumenou et al., 2015). Hsu and Wang suggest that these obstacles can be overcome if the presenters familiarise themselves with the webinar tool in advance and are prepared for any technical glitches.
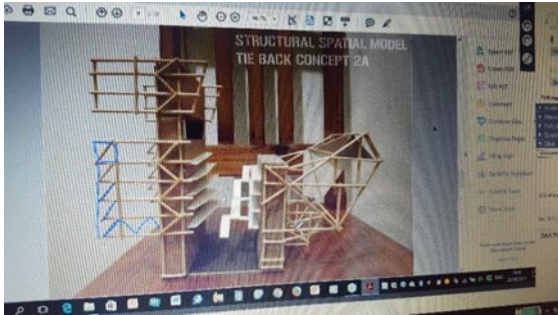
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Figure 3: Online session employing multiple media (Photo: J Morkel)

-Participant-invisible
The live online crit lets participants be heard rather than seen. Students and tutors use audio and digital pen markings to explore the work submitted for review. The webcam is not used.

Only one student (S8) identified communication 'directly over a microphone', as a challenge:

I find online/webinar crits somewhat stressful since I find it difficult to communicate directly over a microphone instead of addressing directly in person. The flow of conversational discussion is somewhat disjointed in comparison to regular in person discussion. (S8)

The prominence of audio as a means of communication (listening) causes some students to feel more exposed. The conversation, when turned to the presenting student, seems to be highly focused, with all attention directed at her, as explained by G6:

...I think what made me anxious about the online crit was the fact that everyone was listening in. It was like you were under the spot light and your work was now under scrutiny by a panel of judges [tutors] and students listening in. (G6)

At the same time, others feel more at ease and less stressed in the absence of personal visual interaction (looking), both from the perspective of looking,

You would not be looking [at] anyone who would otherwise make you feel nervous in a face to face crit. (G5)

and being looked at:

The good thing about online crits is that, you don't feel pressured from the eyes of our (sic) peers. (S4)

Because participants can't see each other, one would expect multi-tasking to occur in the online crit setting. Yet, it is not subjected to the usual distractions associated with the physical face to face studio setting, as suggested by B:

...You know the other people are listening more, more closely, and like student A said, you don't want to make a fool of yourself. [Face to face] you can talk amongst each other ... [while] someone else is presenting... Well, I think it's a thing of you log on alone, but you're part of this group, so you [you] listen more intently, and if you're in a [physical] group like this you can sit and chat while they're critting, so I think it's better if you're alone in a group, than in an actual group. (B)

This supports the literature, for example Ng (2007) found that the absence of physical presence online seems to relax students. In his research on the online tutorial, students reported, not only on the ease of asking questions 'behind the veils', but that they were able to better formulate the questions as well.

This resonates with Hassanpour, Utaberta and Zaharim's (2010: 282) findings that, in traditional crit sessions, students fear to perform 'in front of looking eyes.' They claim that, because of students' fear of eye contact, they often fail to hear the tutor feedback.

-Ubiquitous
The live online crit is 'everywhere'. This learning setting provides a virtual space for students and tutors to meet, regardless of the location of their homes and workplaces. Students, tutors and visiting experts can join

the crit from different locations and even across different time zones.

Technology has made it possible to have crits wherever you are, provided you have a decent internet access and a computer/[or] smart phone. (G6)

Some students reported that the freedom to choose and 'own' the physical space from which they participate in the live online crit, makes them feel more 'at ease', as explained by G5:

Technology in my view has positively impacted the crit in that… One gets to cho[o]se and own their space in which they would do the crit, which makes one more at ease during the crit. The fact that you would be alone in you[r] own chosen environment was relaxing in itself… I could do the crit from anywhere convenient for me. (G5)

There's no clear evidence from the student and graduate responses that the live online crit setting significantly adds to the stress experienced in the traditional crit. Views on this issue differ. Some students argue that stress and pressure are increased because 'everybody is listening', and others say it is reduced because they 'can't see each other'. Students' personal choice of physical learning space, coupled with physical distance, appears to reduce stress through promoting comfort and ease.

It supports the literature (Percy 2004:151) that suggests there's a 'reduction in the power relations between staff and students' and that students were more 'relaxed in their home environment'.

-Media-intensive
In their feedback, students, graduates, and tutors mention the presence of multiple media for different forms of communication in the live online crit. T4 explains how technology expands the forms of communication face to face and online:

Technology has increased the ability to use many forms of communication whether f2f or online. (T4)

In this virtual studio setting, all material, whether in two or three dimensions, that students and tutors engage with online, are presented in digital format (Morkel 2016, Poulsen & Morkel 2014) for discussion, regardless of the media through which these were generated e.g. physical models, hand drawn sketches, computer generated graphics, photos or graphic and text references and research. It also doesn't matter in which of the other blended learning settings the artefacts were produced i.e. in the workplace, design journal or on-campus block. As explained by G6, all the work is in one (online) place – students don't need to carry the drawings with them:

With the online crits you don't have to carry large amounts of drawings with you as all your work is uploaded. (G6)

B refutes the common belief that the digital medium excludes engagement with analog and physical media, deemed necessary for developing design expertise:

…I don't think that people should be scared just because you're doing online crits, you're gonna lose process models because process models is like the way you've been taught to figure things out. So, if you've been taught to do it, you will know it makes your life easier, and you know… (B)

The graphic material that forms the focus of the crit is uploaded prior to the crit, displayed on-screen during the crit and available through the recording, after the crit (Poulsen & Morkel 2016). Students value the importance of the graphic content of their crit submission, as suggested by C:

You have to explain yourself better graphically… through your online presentation. (C)

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Although on-screen pointing and sketching may be less spontaneous and drawing with a mouse is not ideal, on-screen markings play an important role in online crit communication.

> *The drawing with a mouse is not ideal… (S20)*

> *...the ability to doodle on screen helps a lot in not losing too much with regards [compared] to actual face to face interactions. (S12)*

T5 argues that the live online crit helps the student to communicate her argument and design premise both verbally and graphically:

> *...Argument and design premise is absolutely paramount for the student to get his/her point across clearly both verbally and graphically. No other [online] interference [sic] focusses all attention on this. (T5)*

These findings support the literature (Bailey 2005, Maftei & Harty 2015, Oh et al. 2013, Schön 1983) claiming that a range of communication media should be present and combined for best crit results; with sketching used as an important component (Goldschmidt, Casakin, Avidan & Ronen, 2014), but contradicts the literature (Oh et al. 2013) that propose synchronous online learning lends itself best to text communication.

Hsu and Wang (2008, in Zoumenou et al. 2015) suggest the webinar works well for real-time multimedia demonstrations. Although some of the graduates claim the hands-on experience, for example through model-building, does not get lost in the live online crit, Wang and Hui-Yin (2008, in Zoumenou et al. 2015) posit that hands- on demonstrations were less effective in the online environment.

-Multi-communicational
The live online crit setting accommodates multiple media, including live audio and the digital representation of two and three-dimensional graphics submitted online by the students, that are visible through screen-sharing. It also allows for multiple tools on the webinar platform, including text chat and co-browsing, used simultaneous. The latter was highlighted by B, D and G4, in their feedback:

> *And that's another thing: in an online crit, Tutor 3 used to do that a lot, he posted links… And I think most people then went on to that link, checked it out quickly, where, on a normal [traditional] crit you won't be able to… (B)… yes, you won't get that information… (D)*

> *[It is] … easy to reference to online precedents [shared] by [the] Lecturer. (G4)*

The webinar software used for the live online crit, GoToWebinar, does not allow participants to text chat with each other. They're also no able to see who else is present in the online crit. Through the Webinar text chat, participants can only interact with tutors who have organiser status. The student WhatsApp group that was used mostly for asynchronous conversation, was also used as a student back channel during the live online crit sessions, as explained by student A:

> *Well, [we used WhatsApp] all the time… Normally we would be talking to each other on the WhatsApp group while we were being critted or whatever… (A)*

Through it, they provided peer to peer support by offering hints and information during the live online crit.

> *Yes, we'll say 'have a look at this building' or 'why don't you try this?' It's actually very good feedback that you get from your peers. (E)*

Even though the webinar platform is best suited for one-on-one personal interaction as stated by T4,

> *The one-on-one personal interaction around a design issue is what makes this mode of learning different to other modes. (T4)*

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by accommodating multiples tools, like WhatsApp, parallel conversations can be conducted.

These findings support Hsu and Wang's (2008, as cited in Zoumenou et al. 2015) identification of multilevel interaction as one of the five advantages of webinar tools. It adds to the research by Anderson, Fyvie, Koritko, McCarthy, Paz, Rizzuto, Tremblay & Sawyers (2006 as cited in Ng), that found that the live online learning environment

provides multiple tools for communication and presentation. Their research, however, was focused on the internal webinar tools and didn't include external tools such as the WhatsApp chat. These findings also support Ng's (2007) view that the webinar platform is a teacher-led learning environment that works best for one-on- one communication. However, in this case, through its accommodation of multiple tools, active peer to peer interaction can exist parallel to it.

-Formal
A strong theme that emerged from the graduate focus group interview and online surveys completed by students and graduates, is the formal character of the live online crit, as suggested by B:

> *I think the online webinar will be more formal again. Standing at my drawing board with a lot of bumph, discussing whatever I did, is a lot less formal than presenting your work on a webinar. (B)*

Students and tutors compare it to a formal presentation, for which preparation is essential, to get proper tutor feedback. The formal and focused nature of the live online crit and rigorous scheduling, requires students to clearly present their thinking, as explained by A and T4:

> *Online was definitely more like a presentation, also due to the time constraints… You really had to present it to… (A)*

> *The online crit tends to be more focussed than f2f as time is limited, students have to prepare adequately beforehand and the discussion is more measured. (T4)*

Given the time constraints, as E explains, students must come prepared, be organized, properly articulate their ideas graphically, systematically compile them and carefully plan how they will be verbally presented.

> *It's like when online you have to be a bit more clear, or more complete so that it… because if you come to a [traditional] crit, you can come with your scrap papers and you can still draw on that, to show your ideas, but with the online [crit] you sort of need something that's a bit more neater and a bit more resolved… you think about like 'I'm gonna start with speaking this' and you think about systematically how you will like layout your work in which order, but with the face to face crit you can just come with your pile of drawings and throw it out on the table and just work your way through it. But it needs to be much more organised with the online crit. (E)*

T5 suggested that the live online crit may be more effective if the students came even more prepared and focus on where the problems are, avoiding repeat information:

> *Online crits can be improved if students are more prepared and if they can be assisted more to focus on the key aspects of what they need help with. Quite a bit of time goes into repeat information rather than focusing on where the problems are. (T5)*

Students appreciate the value of the formal aspect of the live online crit to contribute to learning as confirmed by A:
> *Yes, I think so definitely [it helps with the learning] (A)*

and it helps them learn about the importance of presentation to sell ideas:

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they learn (without knowing) that presentation is key to "sell" architectural ideas. (T5)

B suggests that this learning setting ensures that students properly articulate their ideas rather than waiting for the tutor or a peer to step in.

... Yes, I've learnt that if you keep quiet long enough [in a traditional crit], if you get asked a question, someone will lead you into the answer, so if you do that f2f the lecturer, or not necessarily the lecturer, but someone will... I don't wanna [sic] say be be uncomfortable in the silence and then start talking, and lead you to what they were thinking, where online it's different, that you... (B)

Yet, the formal and organised nature of the live online crit, although efficient and focused, seems to limit opportunity for informal and serendipitous learning as emphasised by T1:

Face to face... conversations have the convenience of the actual pen to paper communication and they sometimes show some hidden thought process that the student deems irrelevant but that the lecturer [tutor] picks up. The idea of, " o[h] what is this little sketch here". (T1)

These findings support the literature by Anderson et al. (2006 as cited in Ng 2007), that the rigorous scheduling of the synchronous online tutorial requires formal and focused interaction.

- Accessible
The live online crit provides equal learning opportunity to all students to participate in and attend all scheduled sessions, through access to the same shared screen in the synchronous session, as well as access to all the recordings afterwards.

The strength in online crits is the ability for students to participate in each and every crit session given and benefit equally, rather than just getting your own crit, watching 2 other people's crits, and going home... I

personally look at (almost) everyone's work wholistically [sic] and try [t]o build a general idea of what is correct and what isn't. This would never be possible through conventional crits. Conventional crits were a nightmare. (S20)

Not only do crit recordings help students to revisit their own crit interactions, to make sure they understand, and in case they missed important feedback,

[The] online crit via webinar for me worked very well. First the fact that the crit was recorded meant that I could revisit at any time, those comments made about my work and listen to them word for word. (G5)

but students can also relate the feedback that others received, back to their own projects, using the crit recording as a learning resource and thereby reducing the need for unnecessary repetition by tutors:

I could listen in to other crits and apply some advice given to other students instead of the lecturers repeating things to each student. (G5)

Graduate A reflects on the value of observing someone else's crit:

I found that most of my lightbulb moments was when I was looking at someone else's stuff. (A)

and revisiting your own crit as a 'third person':

... by listening to other student crits, you learn as well. Being able to re-listen to previous cirt [sic] sessions at own time has been beneficial because you view your feedback as a 3rd person. (S6)

Finally, G6 suggests that the value of the recorded crit as a resource can be more widely used for learning, teaching, quality assurance and research:

[Crits] can now be recorded and replayed fro [sic] clarity... These can then be used to

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educate others who join architectural schools and curriculum researchers to further refine the experience of the crit. (G6)

Another aspect of the live online crit that relates to equal learning opportunity, is how online turn-taking helps to ensure that every student is given a turn to present her work and elicit conversation and feedback. As A and D jokingly remark, it's not so easy to avoid an online crit:

Yes, and you can't avoid the crit. Like you know, haha…like sometimes if it's a crit in person, you get to a class where there's lots of students, you can hide. (Student A)

…like behind the wall (Student D)

… whereas you know online, like we all realized, you know, you are definitely going to be critted… (A)

Students say that the live online crit works well with many observers (S8 refers to 'spectators') because everyone can see the work shared on-screen, on their own devices. The size of the crit group is not limited by proximity to and visibility of the crit material.

Face to face [there is an] efficient flow of communication, [but] somewhat restrictive for spectators [whereas] online [it is] logistically very convenient, easy for large numbers or viewers to be involved. (S8)

It supports literature that suggest that 'students hear all critiques of all projects and benefit from feedback to their peers' (Bender & Vredevoogd 2006: 119), and whenever they want it (Oh et al. 2013). It also supports literature that suggest that students get access to the same tutor feedback 'unlike the front row advantage' in conventional settings (Romiszowski 1988, as cited in Bender & Vredevoogd 2006: 119).

-Work-focused
The student, graduate and tutor respondents agree that the live online crit is focused on the work. One of the main reasons is the screen-sharing of online submitted student work, that appears on all participants' device screens so that everybody is looking at the same image:

You deal with the images on the screen. It's more direct. (Student C)

Both parties are more focused on the discussed issue or what is displayed on the screen. (G12)

The webcam is not used (Poulsen & Morkel 2016) and therefore, instead of the participants, the emphasis is on the images and on-screen drawing activity and accompanying verbal conversation. Students and graduates reported that the absence of gesture and facial expression in the crit, avoids misunderstanding due to the misreading of facial cues. They also suggest that it helps to hold the attention of both students and tutors in the crit and limit distractions.

Presenting your work with use of webnair [sic] software with help of audio and video helps in distance learning as well as avoiding misjudging by facial presentation but focus on work done. (S14)

It also helps you to stay focused. F2f sometimes someone gets distracted, where online … everybody is focusing on the work. No distractions. (D)

Although the literature suggests the importance of non-verbal cues in the crit (Anthony 1991, as cited in Oh et al. 2013), none of the respondents reported the absence thereof to negatively impact on the crit. On the contrary, students and graduates suggested that these can be confusing and distracting. Anthony (1991, in Oh et al. 2013) posits that the effective use of nonverbal expression can enrich the student-tutor interaction in the traditional crit, but also admits that facial expression and tone of voice can confuse students, if great care is not taken by tutors to be consistent and positive in their non-verbal communication. This view is supported by our findings.

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-Resource-saving
Graduates and students experience the live online crit as saving time and money; saving time through focused engagement and saving money through limiting paper(G4), printing (G6) and traveling (G5):

Technology allows the crit to be straight to the point through the use of Webinar. No wasting of time pinning up paper or waste of paper. (G4)

Most of the work is in a digital format already and then creating a pdf and uploading is much easier than making costly prints for a crit. (G6)

It saves a lot of time which would have otherwise be spent moving and getting to venues. (G5)

The crit remains a time-consuming, labour-intensive and costly educational model (Hitge 2006, McCarthy 2011), and therefore efficiency is paramount. Although the literature does not specifically speak to the cost benefits of online learning for students, affordability was identified by Hsu and Wang (2008, cited in Zoumenou, 2015) as one of five advantages of this medium.

-Inclusive
The final characteristic of the live online crit that emerged from the graduates', students' and tutors' responses, is that it widens access and expands the range of participants. The online medium can reach more students and provide access to a broad range of experts with diverse backgrounds and skills.

Online has the advantage of reaching more students and also an easy way to "dial in" an expert on an ad hoc basis, thus access to a wide range of opinions. (T1)

It can now involve a lot more people from different locations and one can get a wider diversity of views about their work. (G5)

As explained under the points 'Media-intensive' and 'Accessible' above, the crit recordings, through their availability to all students, provide access to all the learning conversations and no one is excluded.

These findings support the literature that suggest the online setting widens access and enhances convenience (Lowenthal et al. 2017). The findings further support Hsu and Wang's (2008, in Zoumenou 2015: 64) reported advantage of the webinar through 'archiving of seminar content for personal review or for people who missed the real-time session'.

Discussion
The first three characteristics of the live online crit that were identified in this study, are presented in terms of their impact on the stress experienced by students. The reason for highlighting this theme, is the prominence given to the impact of stress caused by the traditional crit, that was found in the literature. McCarthy's study, 'Redesigning the Design Crit' (2011) identifies student anxiety as one of the main criticisms against the traditional crit, together with 'student inability to learn from the feedback given due to the heightened atmosphere of the crit' (McCarthy 2011:5).

In this study, students reported opposing views on the degree of stress experienced in the live online crit.

I think that the crit was just a serious part of our work that one needed to prepare for, but not necessarily stressful. (G5)

Me being naturally an anxious/ stressing person, I found the online crit quite stressful… (G6)

The most prominent characteristics of the live online crit found in the data, that impact on stress, include its reliance on power and internet connectivity, participant- invisibility with audio as the prominent mode of communication, that provides a setting where students are listened to rather than looked at; and that it is 'everywhere'.

The data produced ten characteristics of the live online crit. Although these may not all be unique to the live online crit, together they

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present a picture of the nature of this learning setting. The live online crit is internet-reliant, participant-invisible, ubiquitous, media-intensive, multi-communicational, formal, accessible, work- focused, resource-saving and inclusive.

Its internet reliance means that technical difficulty, slow network transmission and speed, poor audio and loss of internet connection can negatively impact on synchronous online sessions, but with experience and some flexibility in terms of rescheduling, this obstacle can be overcome. Hands-on demonstrations are less effective in the online environment and the formal and organized nature of the online crit inhibits informal and serendipitous learning. Care should be taken to create opportunity for these learning experiences elsewhere, as part of a blended learning approach.

The absence of physical presence online appears to remove some of the stress barriers, reduce the imbalance in power relations between students and design tutors and help to relax students. The online use of a range of communication and interaction media and tools should be encouraged, to promote rich and multiple crit conversations. There is no limit to the number of crit participants online and students have access to all the learning conversations, so no one is excluded.

Conclusion
It is hereby not suggested that the online crit should replace face to face crits entirely. Instead, it is argued that, based on the characteristics identified in this study, the live online crit may expand the current crit practices of the physical studio. An understanding of the value that it can add, and its limitations, can help educators and tutors design learning interventions suitable to specific learning contexts, towards addressing challenges related to student diversity, limited resources and a rapidly changing higher education context, exacerbated by health and climate crises. As a result, not only will learning be accessible more easily to mature and working students, but graduates will be better equipped to navigate

multiple physical and online modes of interaction, resilient to disruption and suitable to practising architecture in the 21st Century

References
Anderson, L., Fyvie, B., Koritko, B., McCarthy, K., Paz, S.M., Rizzuto, M., Tremblay, R. and Sawyers, U., (2006). Best practices in synchronous conferencing moderation. *The International Review of Research in Open and Distributed Learning*, 7(1).

Anthony, K.H., (1991). *Design juries on trial: The renaissance of the design studio*.

Banou, S. and Tahsiri, M., (2021). Catalyst Pedagogies and the Pandemic Displacement of Architectural Education. *Charrette*, 7(1), pp.1-13.

Bailey, R.O.N., (2005). *The Digital Design Coach Enhancing Design Conversations in Architectural Education*.

Bates. (2018). Teaching in a Digital Age. [ONLINE] Available at: https://www.tonybates.ca/teaching-in-a-digital-age/. [Accessed 20 February 2018].

Bender, D.M. and Vredevoogd, J.D., (2006). Using online education technologies to support studio instruction. *Educational Technology & Society*, 9(4), pp.114-122.

Blair, B., (2006). Perception interpretation impact: an examination of the learning value of formative feedback to students through the

Journal of Design Studio, v:4 n:1
Morkel, J., Cronjé, J., (2022), Alone in a Group; Ten Characteristics of the Live Online Critique

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design studio critique (Doctoral dissertation, Institute of Education, University of London).

Braun, V. and Clarke, V., (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), pp.77-101.

Creswell, J.W., (2007). Qualitative inquiry and research design.

Cronjé, J.C. (2016). 'Learning Technology in Higher Education', in Rushby, N. and Surry, D. (eds), *The Wiley Handbook of Learning Technology* (Vol. 1). John Wiley & Sons, pp. 131-144.

Doidge, C., Sara, R. and Parnell, R., (2007). *The crit: an architecture student's handbook.* Routledge.

Gachago, D., Morkel, J., Hitge, L., van Zyl, I. and Ivala, E., (2017). Developing eLearning champions: a design thinking approach. *International Journal of Educational Technology in Higher Education*, 14(1), p.30.

Goldschmidt, G., Casakin, H., Avidan, Y. and Ronen, O., (2014). Three studio critiquing cultures: Fun follows function or function follows fun?. DTRS 10: Design Thinking Research Symposium 2014 – Purdue University

Hasirci, D. & Demirkan, H., (2007). Understanding the Effects of Cognition in Creative Decision Making: A Creativity Model for Enhancing the Design Studio Process. Creativity Research Journal, 19(2–3), pp.259–271. Available at: http://www.tandfonline.com/doi/abs/10.1080/10400410701397362.

Hassanpour, B., Utaberta, N., and Zaharim, A., (2010). Redefining Critique Session as an Assessment Tool in Architecture Design Studio Class., *Wseas Trans. Adv. Eng. Educ.*, Issue, 9, pp.287-298.

Hitge, L.M., (2016). *Cognitive apprenticeship in architecture education: Using a scaffolding tool to support conceptual design* (Doctoral dissertation, University of Cape Town).

Koch, A., (2002). The redesign of studio culture: A report of the AIAS Studio Culture Task Force. American Institute of Architecture Students.

Kuhn, S., (2001). Learning from the architecture studio: Implications for project-based pedagogy. *International Journal of Engineering Education*, 17(4/5), pp.349-352.

Laurillard, D., (2008). Technology enhanced learning as a tool for pedagogical innovation. *Journal of Philosophy of Education*, 42(3-4), pp.521-533.

Lotz, N., Jones, D. and Holden, G., (2015). Social engagement in online design pedagogies. In: *Proceedings of the 3rd International Conference for Design Education Researchers* (Van de Zande, Robin; Bohemia, Erik and Digranes, Ingvild eds.), Aalto University, pp. 1645–1668.

Lowenthal, P.R., Dunlap, J.C. and Snelson, C., (2017). Live Synchronous Web Meetings in Asynchronous Online Courses: Reconceptualizing Virtual Office Hours. Online Learning.

Lymer, G., (2010). The work of critique in architectural education. Department of Education, Communication and Learning; Institutionen för pedagogik, kommunikation och lärande.

Maftei, L. and Harty, C., (2015). Designing in caves: using immersive visualisations in design practice. *International Journal of Architectural Research: ArchNet-IJAR*, 9(3), pp.53- 75.

McCarthy, C., (2011). Is the design crit worth keeping? Testing the validity of the traditional crit and potential alternatives. *Deakin Research Online*, p.246.

Morkel, J., (2013). Open Architecture – Authentic education for the future. *Architecture South Africa*, (64), pp. 19-20.

Morkel, J., Delport, H.E., Burton, L.O., Olweny, M.O. Feast, S. (2021). Towards an

Journal of Design Studio, v:4 n:1
Morkel, J., Cronjé, J., (2022), Alone in a Group; Ten Characteristics of the Live Online Critique

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ecosystem-of- learning for architectural education: Reflecting on a network of six pedagogical clusters. Charrette Volume 7, Number 1, Spring 2021 (1 March) pp. 15-40(26). Catalyst Pedagogies & the Pandemic Displacement of Architectural Education https://www.ingentaconnect.com/content/arche d/char/2021/00000007/0000000 1

Mitgang, L. D. (1999). 'Back to School: Architects Sound Off on 10 Critical Issues Facing Architectural Education'. *Architectural Record*, Vol. 187, No. 9, p. 112.

Ng, K.C., (2007). Replacing face-to-face tutorials by synchronous online technologies: Challenges and pedagogical implications. *The International Review of Research in Open and Distributed Learning*, 8(1).

Ng'ambi, D., Brown, C., Bozalek, V., Gachago, D. and Wood, D., (2016). Technology enhanced teaching and learning in South African higher education–A rearview of a 20 year journey. *British Journal of Educational Technology*, 47(5), pp.843-858.

Oh, Y., Ishizaki, S., Gross, M.D. and Do, E.Y.L., (2013). A theoretical framework of design critiquing in architecture studios. *Design Studies*, 34(3), pp.302-325.

Osborne, L. & Crowther, P. (2011). Butterpaper, sweat & tears: the affective dimension of engaging students during the architectural critique. In Association of Architecture Schools of Australasia 2011, 18 – 21 September 2011, Deakin University, Geelong, VIC.Oh, Y., Ishizaki, S., Gross, M.D. and Do, E.Y.L., 2013. A theoretical framework of design critiquing in architecture studios. *Design Studies*, 34(3), pp.302-325.

Percy, C., (2004). Critical absence versus critical engagement. Problematics of the crit in design learning and teaching. *Art, Design & Communication in Higher Education*, 2(3), pp.143-154.

Poulsen, L. and Morkel, J., (2016). Open Architecture: Part-time Blended Study Model. *Architecture South Africa*, (78), pp. 28-33.

Quinlan, A., Corkery, L. and Marshall, N., (2007). Positioning the Design Tutor's presence in the Design Studio for successful student design learning. In *Connected 2007 International Conference on Design Education*, pp.1-6.

Republic of South Africa. (2019). Inquiry and Equity Ownership by Historically Disadvantaged Groups and the Application of the ICT Sector Code in the ICT Sector. Government Gazette no. 42234, 15 February 2019.

Rushby, N. and Surry, D., (2016). *The Wiley Handbook of Learning Technology* (Vol. 1). First Edition. Edited by Nick Rushby and Daniel W Surrey. John Wiley & Sons.

Schön, D.A., (1983). The reflective practitioner: How professionals think in action.

Schrand, T. & Eliason, J., (2012). Feedback practices and signature pedagogies: what can the liberal arts learn from the design critique? *Teaching in Higher Education*, 17(1), pp.51–62.

Shulman, L.S., (2005). Signature pedagogies in the professions. *Daedalus*, 134(3), pp.52- 59.

Smith, C., (2011). Understanding Students' Views of the Crit Assessment. *Journal for Education in the Built Environment*, 6(1), pp.44–67.

UIA. (2017). UIA.[ONLINE]Available at: http://www.uia-architectes.org/sites/default/files/charte-en-b.pdf. [Accessed 20 February 2018].

Voulgarelis, H. & Morkel, J., (2010). The importance of physically built working models in design teaching of undergraduate architectural students. Connected 2010 - 2nd *International Conference on Design Education*, (July), pp.1–8.

Journal of Design Studio, v:4 n:1
Morkel, J., Cronjé, J., (2022), Alone in a Group; Ten Characteristics of the Live Online Critique

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Webster, H., (2004). Facilitating critically reflective learning: excavating the role of the design tutor in architectural education. *Art, Design & Communication in Higher Education*, 2(3), pp.101-111.

Webster, H., (2005). The architectural review: A study of ritual, acculturation and reproduction in architectural education. *Arts and Humanities in Higher Education*, 4(3), pp.265-282.

Zoumenou, V., Sigman-Grant, M., Coleman, G., Malekian, F., Zee, J.M., Fountain, B.J. and Marsh, A., (2015). Identifying best practices for an interactive webinar. *Journal of Family & Consumer Sciences*, 107(2), pp.62-69.

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Critical Reading in Architectural Education

Emel Birer ⓘD
Istanbul Kultur University Department of Architecture, Istanbul, Turkey

Abstract: Architectural production is a text. Texts; while producing the new based on the other, architecture needs, production social life, technology, the geography where it is produced, etc. It is formatted by references before it, as well as elements. Blending this production into architectural education must be carried out adding readings on architectural design conception and teaching the articulated power of the theoretical structure of design. The need to rebuild, reinterpret and reproduce knowledge in the mind of each individual in their own way necessitates the questioning of the need to surpass the centred position that teaches the teaching method of the studio. The aim of this study is to prove the possibility of a method that by incorporating architectural texts and theory books into undergraduate education makes these texts more comprehensible, by demonstrating the contributions of these courses in architectural design studio. In accordance with this purpose a methodology suggestion has been tried to read and understand texts as part of production in architectural education. This methodology is formed by superposing steps towards understanding architectural theory texts through critical reading with learning steps towards transforming the text from conceptual maps to images. This way architectural education is rendered a whole with design and theory altogether and as a result, subjective construction of knowledge defines the key concepts of design studio as criticism and reconstruction.

Keywords: Architectural Education, Studio, Critical Reading, Conceptual Map, Visualising

Introduction

Architecture, being in relation with a series of disciplines such as literature, philosophy, history and linguistics, is constantly questioning its ontological foundations. Architecture uses literature for its original and free linguistic attributes, philosophy to formulate clear conceptual infrastructures for its ideological statements, and history as part of its study material. It can be asserted today that instead of a literary tradition in architecture that represents itself through form based studies only, representation by theoretical discourse and texts is more popular. In this said production, narratives sit in the centre point of textual representation, attributing great importance to the writer and the reader (Ersoy, 2013). Much like other domains of education, these quests for new methods in architecture find themselves in more flexible and innovation-seeking learning environments that prioritize learning by doing and combine more traditional methods and tools with fresh and cutting-edge technologies instead of approaches that succeed previous schools such as Bauhaus or Beaux Arts.

In our time, each domain of education seeks after raising individuals equipped with maps towards knowledge and critical thinking. In this regard, architectural education is a matter of creating the environment to nurture the learning habits and the mind structure that is required for life-long discovery, composing, sharing and applying abilities. The term "architectural education" that renders studying paradoxical subjects of architectural knowledge that are in constant change and reluctant to change altogether possible, may contribute to the development of a learning centred education strategy and tactics (Yücel, Aydınlı, 2015). This development necessitates also a research

approach that is different from the suggested models of architectural education. An approach that is founded upon the ideal of architectural education should be learning centred; and hence incorporates the development of educational strategies that aspire to offer abilities such as comprehension, internalisation of skills and knowledge and awareness and various tactics compliant with different perspectives. In learning centred education, the target is to "learn the way of learning" and creating the required atmosphere in accordance by the teachers. Science inspects how things are, whereas design is considered with how things can be (School of Schools Bienale, 2018). "Learning the way of learning" allows the individual to understand and rethink the environment by nurturing skills to comprehend how knowledge is altered by changing conditions, its determinism and how to reinterpret it.

Tekeli (2014) emphasizes that the architectural studio is the fundamental mechanism in teaching the design skills to students and these lessons should be evaluated with their unnoticed contributions that are of equal values. In the studio, the student takes a subject, soaks it through research, defines relevant issues, offers solutions to them, presents and defends the outcomes, receives and answers to criticism and holds the ideological ground. What needs to be prioritized is raising architects that can think flexibly in the ambiguous and dilemmatic domain of architecture, which is a recently spreading phenomenon, question and transform knowledge and tolerate complex and contradictory problems (Aydınlı, 2001). According to Yürekli and Yürekli (2004), universities should pay attention to the intellectual improvement of the students as much as the vocational education. Gasset, in Mission of the University (1998), advocates that the knowledge to be acquired in education springs when conflicted with the limits of learning skills. In our time, the abundance culture and technique alike, bears potential risk of a catastrophe for people and aggravates, even makes it impossible, for the new generations to digest (Gasset, 1998).

However, in the pre-modern era, architectural knowledge comprised solely the knowledge of construction. The suggestion that architecture can only be produced via construction has resulted in architectural knowledge being driven from the built. This reductive idea has long been abandoned. In the modern era, the idea of architecture being limited to the built has been significantly transformed by the suggestion that it also covers what has been produced upon the built. This way, production about the produced or constructed has entered the field of architectural knowledge. Tanyeli (1999) defines it as "theoretical knowledge", mentioning that while the "knowledge of making" dominated the time before the twentieth century, with the 20th century and forth, the "actual knowledge of architecture" that includes the "theoretical knowledge" as well as the "knowledge of construction" has started burgeoning.

Architectural writing, which plays a great part in the literary representation of architecture, is concerned with theoretical knowledge and related to the history writing tied with the tradition of interpretation. Historiography as an activity of reconstruction, is evaluated in terms of three main approaches such as constructive, reconstructive and deconstructive. Reconstructivist approach that has been derived from the constructivism, suggests that history can be known and re-written as it originally was, while the deconstructivist movement lead by a group of writers such as Jacques Derrida, Hayden White, Keith Jenkins, has construes the act of reading historical events and boundaries of the documents as an act of reconstruction (Durmuş, Öymen Gür, 2017). According to the traditional perspective, what comes to mind in terms of text is the written word. However, the semioticians have enlarged the limits of the literary concept and the assertion that every phenomenon that a meaning is derived from is a text has started to gain recognition. (Ricoeur, 1971; Siegel 1984; Rowe, 1987; Hartman and Hartman, 1993; Lenski, 1998; Barthes, 2005; Lefebvre, 2014; Barthes, 2015). What A. Toffler (2011) suggests, "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn,

and relearn", demonstrates clearly the importance of knowing the methods and ways of learning in the new age (Balay, 2004; Toffler, Toffler, & Gibson, 2011). Architecture can be discussed on a parallel basis that considers architecture as a text or accepts that architecture may be read like a text. Since architecture too is constantly reproduced in changing places and contexts throughout time.

One of the research channels that contributes to the production process of architecture is architectural texts and theory books. These texts are given to the students sometimes in design studios and other times in theoretical courses that support the studio as reading lists or individually to help understand and make meaning of the natural structure of production. Just like in the design studio, the transmitted knowledge aspires to improve the intellectual world of the architecture candidate. This study offers the idea of a method that creates a conceptual map by the critical reading of theory books, turns this map into an image by collaging different means of architectural representation, and exposes the design and theory union in architectural education.

This study discusses the hypothesis that concept maps will help in understanding architectural theory books. In this study, there is a method proposal in which reading theory books with a critical reading is discussed, and it argues that making the critical text more understandable by being visualized together with concept maps will contribute to studio education. In this context, the theoretical background of the study consists of the concepts of critical reading, concept maps and visualization.

Critical reading of architectural theory books
In a general sense theory is a conceptual scheme, used for understanding science and explain phenomena and their relationships (Yıldırım, 2016). In terms of architecture, there are differentiating definitions of theory-architectural theory that exceeds the aforementioned definitions of theory. In example, Nesbitt (1996:16-17) defines architectural theory as a discourse that defines

and promotes the profession and application, while Hays (2002) defines it as the common ground comprised of the relationships between the visual analysis of an architectural production and its context. In addition to this, in architectural theory, the certainty of scientific theory is non-existent (İnceoğlu M. and İnceoğlu N., 2004).

According to Tanyeli, the binarism of architecture can never be understood unless it is accepted that thinking for doing is the same with thinking for understanding in architecture (Tanyeli, 1999). On the other hand, the association of theory and practice has given birth to praxis. Praxis, as Williams underlines, means the theoretical practice (Williams, 2018). This way, the field of architectural knowledge has expanded from only either theory or practice to a field that covers both. As Tschumi asserts, architecture is a form of knowledge and not the knowledge of form (Tschumi, 1996) and the discussion on how knowledge is formed is kept in the background. However, this is an important and extensive discussion that covers not only the formal entities but also the theoretical.

In Taşkın's conception (2006), theory is modifiable and comprehensive suggestions that are supported with proof derived from systematical observations and explain the reasons for phenomenological behaviours; and bear the potential to develop insights and provide questions for new scientific research. Driver et. al. (1996) emphasizes that understanding the nature of science involves understanding the relevance between proof and explanation, which is also a crucial point in learning science. The way the students interpret the proof is determined by their engagement to theory.

If design education is considered as a big puzzle, this puzzle would have a great many pieces that constitute a whole. One part of these pieces is courses such as basic design, design studio, and aesthetics that improve the visual, perceptual, sensory, critical, and mental aspects of students and nurture the artistic and aesthetical aspects of design. The other parts

consist of courses such as design knowledge, theory and concepts that support the theoretical infrastructure of design. (Onur, Zorlu, 2017). The importance of theory is growing larger with the expansion of the limits of visual culture by technology that renders the impact of the image more appreciable. Since the implementations of the previous century is still influential on the theory, experiment based education theory is still acceleratingly effective on implementation. Despite the theoretical limits of art, the educational context constantly aspires to enhance the influence of theory. For the benefit of students, these theoretical endeavours must be extended to professional life (Tavin, Anderson: 2003: 68). In this context, in Figure 1. a list of theory books to be read in

architectural education is given in different groups. This list comprises descriptions and texts on architectural education relevant to the production processes in urban-space-body scale. A list has been created among the books that can help the theoretical process of the architectural design studio. Instead of all the critical works in the history of architectural literature, a reading list translated into Turkish, which is on the agenda and which reads the design phase through the city, space and body, is given as an example. In this manner, how should these books be written and incorporated to production in a process where knowledge cumulates throughout the architectural education?
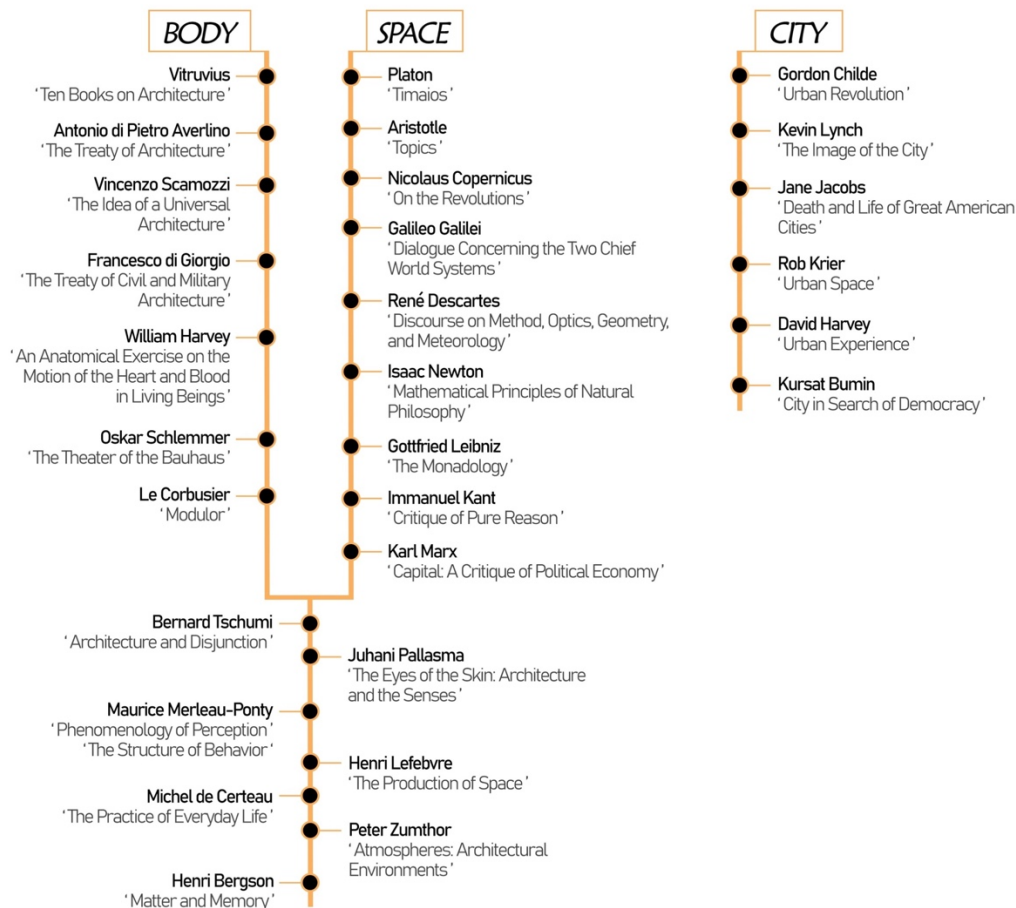

Figure 1: Selection of Theory Books Read in Architectural Education

Criticism, thought to be the equivalent of the Greek word "krinein", means both "a word said on another word" (Gür, 2009) and "sorting out", "distinguishing" and "uncovering differences" (Attoe, 1978); it is a concept that expresses sorting out different ideas on a topic and distinguishing the effective from the non-effective. In studio culture, criticism is not equivalent to its counterpart in the popular culture where the majority determines the recognition; it is in close relation to processes of analysis, awareness, definition, evaluation, and interpretation (Şentürer, 2004). In the academia, criticism is considered as a process of decipherment and understanding the layered relations, and correspondingly, questioning the meaning and attributing new meanings (Güzer, 2009).

Critical reading independent from the studio atmosphere emphasizes the perpetual and organized reading with a critical point of view because in regular reading habits, it is only the perpetually and organisation aspects that are emphasized (Yılmaz, 2004: 116). In critical reading habit, what matters is to maintain perpetually and the critical point of view together. Özdemir (2002: 19) defines critical reading as follows: "The habit of thinking on what one reads, the ability to assess it using the personal standards of judgement." Cervetti, Pardales and Damico (2011) have declared in their studies that critical reading is assessing the text in terms of validity and accuracy. In critical reading, the text must be thought upon, the writer's point of view, message and motivation must be interpreted in addition to just being read. In this context, the reader must execute an appraisal process and discuss it based on their previous knowledge and reading experience. When this turns into a routine, the critical reading habit is acquired. Critical reading is important in terms of gaining critical thinking skills and enhancing the benefit and joy of reading. The non-critical reader takes the statements in directly and memorizes them while the critical reader is interested in what is explained in the book and how they are supported as well as how they are described. In Aşılıoğlu's study, levels of comprehension in cognitive learning is laid out as knowledge,

comprehension, implementation, analysis, synthesis and assessment and a regular reader gets stuck on the first step while the critical reader uses all of them (Aşılıoğlu, 2008).

In this respect, a student is expected to have acquired the critical reading skills in order to read architectural theory and instead of only comprehending the text to produce new meanings by making contributions. This described critical structure of the design studio allows critical reading. Therefore, architecture becomes a multidimensional structure with its theoretical relationships with social anthropology, culture, economy and many other parameters. Its theory with no absolute truth is a result of this aspect of architecture. It passes a certain remark, but it is a general notion that is unprovable and based on the individual and the moment. Theory is shaped by the fluidity of all these parameters in architecture. It is in constant evolution, transformation, expansion, and complexity. How may this transformation be represented in architectural education?

Importance of conceptual maps and visualizing
Conceptual maps are the outcome of a 12-yearlong study initiated by Novak in 1972 and are based on Ausubel's theory of meaningful learning (Novak & Musonda, 1991). According to Novak (1972) a conceptual map is a graphic material that enables the student to associate new subject with the existing concepts. According to Nakhleh (1994), conceptual map is a technique that enhances meaningful learning, provides the student with active learning in the process of knowledge production, responsibility in self-learning and alternative ways in assessing meanings.

According to Ruiz-Primo, Schultz, Li & Shavelson (2001) conceptual maps are mental pictures that depict association of keywords of a subject. In addition to this, Erdem, Yılmaz and Özyalçın Oskay (2009) and Sarıca and Çetin (2012) have established the enhancing effect of conceptual maps on meaningful learning. In a conceptual map, there are concepts, their examples and interrelations, hierarchy and cross references (Novak & Gowin 1984, Novak &

Cañas 2008). According to Novak & Gowin (1984), conceptual maps may be used as a material and evaluation tool for teaching-learning strategies, planning the curriculum and teaching. In education, all activities must be arranged and carried out as to direct the students towards meaningful learning instead of memorizing and individual inventive learning instead of passive learning.

In the recent years the area of architectural knowledge has changed more than ever. In the modern time, also there have been significant epistemological changes in architecture; today these changes have gained new dimensions with the developments in digital technology as well as construction technologies. Nevertheless, production process in architecture has been a topic of discussion both in the recent time and in the modern time. This is because the means of production (serial production) and the agents of production (mechanization) in the modern time has changed. As a result, not only the architectural production itself but also the process of production has created a field of knowledge (Uluoğlu, 2002). Today, there are new means of production (mass production and mass individualization) and new agents of production (digitalization) in architecture. Therefore, a new field of knowledge has been defined by the architectural production and the process itself. Tanyeli (2017), promotes that a new architectural knowledge can come to life through anarchy and suggests making by breaking. What is meant here is not a physical but a conceptual making and breaking, pointing out to the destruction of the architectural knowledge to rebuild it with new concepts. Interdisciplinary relations have caused the changing of architectural knowledge and field of knowledge, while resulting in the development of new methods in conceptualization and design.

As Freire (2014: 39) mentions that in our time "an educational approach comprehending the context and the world must be embraced instead of one that is limited to reading the word and the text." In the recent researches in education (Partnership for 21st century learning (P21), 2007; Pearlman, 2009; Scardamalia & Bereiter,

2014; Yalçın, 2018) frequently emphasize the importance of acquiring the skills of 21st century. These skills are grouped under three categories such as the skill to learn and renew, skills on information, media and technology and vital and vocational skills. In developing these skills, it is important that the teachers should improve and strengthen themselves with knowledge, education and educational approaches involving teaching technologies and new media tools, reflecting them on their educational activities to enrich the learning process of their students (Özsoy, Mamur & Sarıbaş, 2020).

In our minds, there are cumulated masses of information, images and data as per our experience and perceptions. These might be called mental patterns. Associating these patterns and creating a meaningful whole from these associations is an act of construction. The act of designing might turn into an act of making by the mobilizing of these patterns. Cross (2006) and Alexander (1977) define these mental information masses as the code systems of the designer. In this system, there is a connection that turns sounds, meanings and words into visual objects. Much alike, Arnheim (1969) asserts that all mental media is perceptional and information is coded in images.

In terms of design, the newly designed object is a new text that is developed from the associations between the existing texts which are images, codes or patterns that are generated from the previously perceived texts in the mind. Words have imagined responses and lays a bridge between language and image. Concepts are perceptual images and the act of thinking is carried out with their assistance (Arnheim, 1969: 227). For this reason, experiences are coded as images while images pay tribute to all the structural attributes of things and events. The mental mass of visual images in the mind is a multidimensional pattern (Arnheim, 1969: 232). The text-form association method of reinterpreting and concretizing an existing text aims to turn subjective comments into forms. What is essential here is to interpret images through the relation of word and form (Yürekli

and Yürekli, 2002: 53-62). Literature is said to be a field that corresponds to this infinite diversification. It has a texture that promotes imagination and mental associations. According to Weiner (2005), literature that is established through language is the expression of imagination with words (Weiner, 2005).

The field of imagology must be approached from two perspectives; first leans on constantly seeing and observing images and therefore the cognitive processes and perception in the interior of the mind, second on a more complex and neglected area that is the recognition, analysis and interpreting of meaning. Visual designs and meanings of images, whether existing in the memory or not, communicates with the reader. In this respect, to receive the meaning an exponential reading must be done. Of course, the importance of language is undeniable in this, the two communicative systems, visual and verbal, must intertwine. Especially the cultural studies of the recent years in the occidental literature contributes to the progress of these fields (Parsa, 2007).

To read a written word is to expose the meaning of that text. The reader is in a position in the face of the text, making sense of it (Günay, 2003: 14). Just like written texts, visual texts need to be written. The individual affronts the verbal or visual texts should be called the reader. After the invention of television, computer, and especially desktop broadcasting and internet the role of messages in the field of visual communication has changed. Visual images broadcasted from the mass media are meaningful constructions and offers subjective information. Today, communication through images surpasses written words.

Reading is one of the fundamental activities of the human brain when encountered with a meaningful structure. This activity happens in three phases: *perception, memorizing and reconstructing the indicators by reinterpretation* (Günay, 2003:18). A literary or a musical work, a painting or a television advertisement that constitute a meaningful visual structure, all indicators that are created to establish meaning are read, interpreted and analysed in the perceptive ways of its receiver. As explained in Visual Literacy: Image, Mind & Reality by Paul Messaris (1994:180) amongst the most celebrated scientists studying visual literacy and image, the production process of the image and on the contrary the interpretation process of the reader must be discussed together and reach meaning by doing so.

To read and grasp, one must firstly "look". It suffices to look at abecedarian books for children, which are very much enriched by visual material. To make learning the letters easier, they are linked to images. Since letters are abstract figures, pictures and images facilitates the transition to texts. Pedagogue Edgar Dale proves this with "cone of Learning" in the learning process. According to the cone, what sinks in after hundreds of pages is %10 while this percentage is %50 after watching a film (quoted by Buehler, 2000: 8).

In terms of graduate education, text is the dominant element in establishing meaning and narrative. In the century of visual culture, occularcentric societies where images are placed in a central position has grown in the west (Jay, 1993; quoted by Rose, 2001: 7). In Iconology: Image, Text, Ideology, W. J. T. Mitchell seeks to answer two questions: "What is an image and what is the difference between images and words?" Mitchel answers the former as follows: "to be alike, imitate, resemble" (Mitchell, 1986: 7). Every branch of this "pedigree of image" is in relation with a discipline. Mental imaging belongs to psychology and epistemology; optical imaging to physics; graphics, sculpture and architecture to history of art; verbal imaging to literary criticism; perceptional images to the common field of physiologists, psychologists and neurologists. Other recent studies elaborate the visual culture and how it is perceived. John Berger (1972:1) starts Ways of Seeing by this phrase: "Seeing comes before words". Barnard reminds that visual culture courses in Northwestern and Harward universities in the USA are studied in the scientific field (Barnard, 2002:20).

Methodology and materials

Various techniques have been developed to understand the conceptual structure of architectural education. This study exposes the phases of a method developed to understand the book of Bernard Tschumi named Architecture and Disjunction (1996) that is being read to comprehend architectural paradigm better. Below are the steps of the process of producing critical reading skills conceptual map and images, on 25 students from, third, fifth, and seventh semesters that have taken the selective course titled Psychology in Architecture during the 2020-2021 spring term in İstanbul Kültür University Department of Architecture.

1. Step reading/reflecting on/perceiving the given part of the book

2. Step creating the conceptual map/evaluation/memorizing of the given part

3. Step visualizing/ criticizing reinterpreting of the conceptual map (Figure 2).

The attitude survey developed by Oluk, Kan and Emekçi (2016) has been applied to the students at the end of the study. Warner & DeFleur (1969) found in their studies that

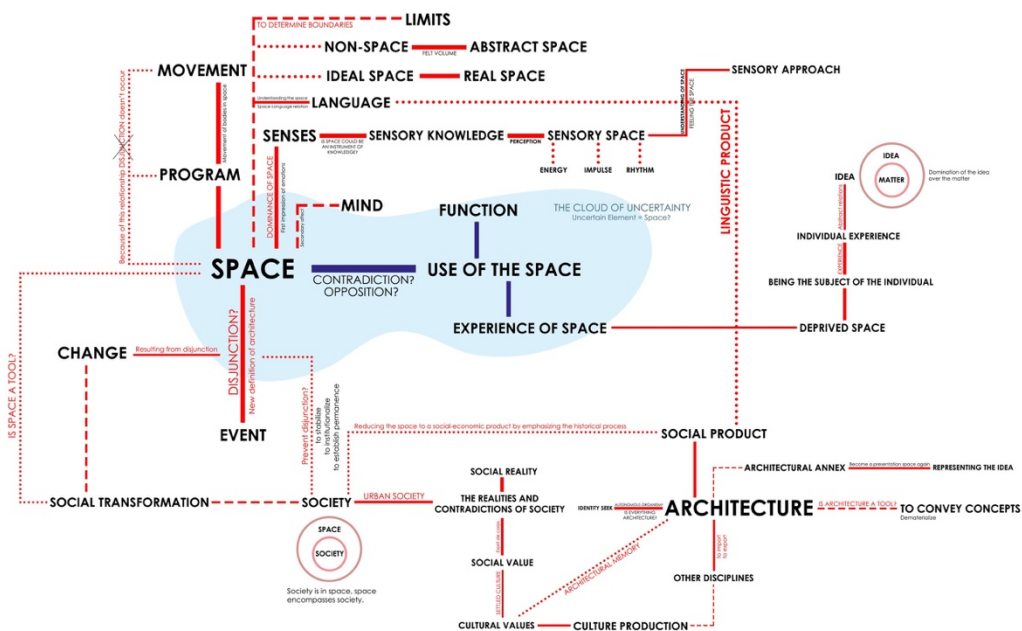*Figure 2: Methodology*

Figure 3: Conseptual Map of Reading Part of the Book (Student Study)

attitude has an effect on behaviour. Attitude, which is described as one of the important affective features affecting learning, has the power to affect individuals' learning positively or negatively (Cited by Tanrıverdi and Demirbaş 2012). For this reason, it is important to determine the attitude of people towards a phenomenon. In this study, the validity and reliability study was conducted with 125 university students prepared by Oluk, Kan and Emekçi (2016), and the attitude scale in which 23 statements and a 5-point Likert scale were used as an answer was used directly.

Findings
1. Step: In this step, the students are asked to read the given pages in the book and reflect on the given part. No commentary has been placed. Perception of the text was targeted in this first step of visualizing the conceptual map.
Students read the first 27-53 pages of the book about space.
2. Step: In this step, the students are asked to prepare a conceptual map upon the part they have read and talk about these maps during the class. In the second phase of conceptual map visualization, concepts mentioned in the book were linked together and memorized (Figure 3).

3. Step: In this step, students were asked to look at their conceptual maps with a critical regard and reinterpret them with the assistance of architectural visuals. At the end of this stage the conceptual collage work was completed. While the first two stages help the students to understand and recognize what they read, the third stage allows them to reinterpret their readings in architectural expression (Figure 4)

Steps of critical reading, reflecting on what one reads, assessing them and using personal judgement of values to do so, explained through the study process of 4 students (Figure 5-8). The resulting image may be evaluated as the recognition, analysis and reinterpretation of the meaning. In this regard, the cognitive process in the production of the image would be executed via perception, memorization and reconstruction of the indicators by reinterpretation.

Figure 4: Visualizing of Reading Part of the Book and Conceptual Map (Student Study)
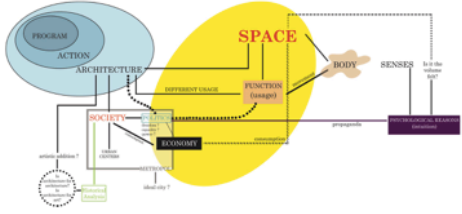
1. S T E P	Reading Reflecting on, Perception	..." That there is no architecture without program, without action, without event. As a whole, these texts reiterate that architecture is never autonomous, never pure form, and, similarly, that architecture is not a matter of style and cannot be reduced to a language. Opposing an over rated notion of architectural form, they aim to reinstate the term function and, more particularly, to rein scribe the move ment of bodies in space, together with the actions and events hat take place within the social and political realm of architecture. But these texts refuse the simplistic relation by which form follows function, or use, or socioeconomics..." (Architecture and Disjunction, p: 11)
2. S T E P	Evaluation, Memorizing	
3. S T E P	Critical regard, Reinterpretation	

Figure 5: *Student Study 1*

1. S T E P	Reading Reflecting on, Perception	..." Object before the subject, it dominated senses and bodies by containing them. Was space inherent to the totality of what exists? This was the question of space for Spinoza and Leibniz. Returning to the old notion of category, Kant described space as neither matter nor the set of objective relations between things but as an ideal in eternal structure, a prior consciousness, an instrument of knowledge..." (Architecture and Disjunction p: 44)
2. S T E P	Evaluation, Memorizing	
3. S T E P	Critical regard Reinterpretation	

Figure 6: *Student Study 2*
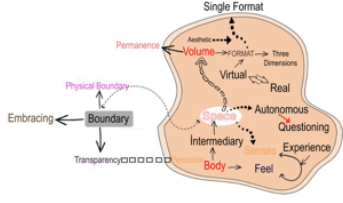
1. STEP	Reading Reflecting on, Perception	... "By restricting visual and physical perception to the faintest of all stimulations, they turn the expected experience of the space into something altogether different. The almost totally removed sensory definition in evitable throws the viewers back on themselves. In "de prived space," to borrow the terminology of Germano Celant, the "participants" can only find themselves as the subject, aware only of their own fantasies and pulsations, able only to react to the low-density signals of their own bodies. The materiality of the body coincides with the materiality of the space. By a series of exclusions that become significant only in opposition to the remote exterior space and social context, the subjects only 'experience their own experience.'..." (Architecture and Disjunction, p:63)
2. STEP	Evaluation, Memorizing	
3. STEP	Critical regard, Reinterpretation	

Figure 7: Student Study 3

1. STEP	Reading Reflecting on, Perception	... "Much of the current confusion about space can be illustrated by this ambiguity. While art and architecture have been concerned essentially with the first sense, philosophy, mathematics, and physics have tried throughout history to give interpretations to something variously described as a "material thing in which all material things are located" or as "something subjective with which the mind categorizes things." Remember: with Descartes ended the Aristotelian tradition according to which space and time were "categories" that enabled the classification of "sensory knowledge." Space became absolute..." (Architecture and Disjunction, pp: 43-44)
2. STEP	Evaluation, Memorizing	
3. STEP	Critical regard Reinterpretation	

Figure 8: Student Study 4

Table 1: Numerical equivalents used in scale rating scale ratings Value Range Scale Rating of Adherence Levels

Value Range	Scale Rating of Adherence Levels	
1.00 – 1.80	Strongly disagree	1
1.81 – 2.60	Disagree	2
2.61 – 3,40	Neutral	3
3.41 – 4.20	Agree	4
4.21 – 5.00	Strongly agree	5

In order to validate the statement "Conceptual maps have helped students better understand the book", the attitude survey developed by Oluk, Kan and Emekçi (2016) has been applied to the students at the end of the study. Trial items of the scale have been prepared using literature review (Okebukola 1992; Rye & Rubba 1998; Karakuyu 2010), expert opinion and the individuals that have been sampled in the study.

The scale has been defined as strongly agree, agree, neutral, disagree and strongly disagree. Positive items are graded as 5, 4, 3, 2, 1 from "strongly agree" to "strongly disagree" while negative items were graded as the opposite (Table 1). Adherence Values of Students to the Opinions in the Attitude Survey Scale on Conceptual Maps are given in the table below. According to these outcomes, "conceptual maps are not compatible with the architectural education" is the least graded item amongst 10 negative attitudes (Table 2).

Table 2: Adherence Values of Students to the Opinions in the Negative Attitude Survey Scale on Conceptual Maps

OPINIONS	N	SD (standard deviation value)	AVR (average value)
Conceptual maps are not compatible with architectural education.	25	0,62	1,36
I find conceptual maps redundant.	25	0,55	1,36
Conceptual maps should not be used in courses.	25	0,75	1,40
Preparing conceptual maps was a vaste of time.	25	0,50	1,48
I would not want to use conceptual maps in courses.	25	0,75	1,52
Conceptual maps make the classes boring.	25	0,69	1,64
Preparing conceptual maps is a nightmare.	25	0,88	1,84
I only use conceptual maps when it is compulsory.	25	0,82	1,88
I'd rather use other methods to study than conceptual maps.	25	1,06	2,48
I find it hard to work with conceptual maps.	25	1,20	2,76

Table 3: *Adherence Values of Students to the Positive Opinions in the Attitude Survey Scale on Conceptual Map*

OPINIONS	N	SD (standard deviation value)	AVR (average value)
Conceptual maps help me learn key concepts.	25	0,40	4,80
I think I understand the subject better when I prepare a conceptual map.	25	0,49	4,60
Conceptual maps make it easier for me to associate concepts.	25	0,57	4,56
Conceptual maps help me improve my knowledge of the subject matter.	25	0,57	4,48
Conceptual maps motivate me to think individually.	25	0,50	4,48
Conceptual maps improve my system of thoughts.	25	0,50	4,44
Conceptual maps are beneficial in sharing my knowledge on the matter with others.	25	0,73	4,32
I enjoy learning new things about conceptual maps.	25	0,79	4,32
Conceptual maps help me see how I understand the subject.	25	1,18	4,24
Conceptual maps help me learn permanently.	25	0,65	4,24
Conceptual maps make the lesson more enjoyable for me.	25	0,95	4,12
Preparing conceptual maps increases my motication in class.	25	0,93	4,08
I participate better when i prepare conceptual maps.	25	1,17	4,00

Students were 33 dressed 13 questions to evaluate their positive attitudes (Table 3) and the statements "Conceptual maps help me learn key concepts" and "I think I understand the subject better when I prepare a conceptual map." Have been strongly agreed by them. Judging by these findings, it is concluded that preparing conceptual maps help critical reading and is an important step in understanding the architectural theory book.

The images that students have prepared after the stages of the book have improved their skills in both critical reading and producing visual images in order to read comprehensibly and narrate what they read. This study has also improved the aspired program outcome of the curriculum by Psychology in Architecture such as critical thinking, questioning, expressing abstract thoughts, evaluating contradictory opinions, discussing outcomes on similar scales.

The importance of spatial experience has been the subject of architectural debates, experience and physical space, which are independent from each other but interacting with each other, have begun to be mentioned together. Experience should be seen not only as a phenomenon of the built space, but also as a phenomenon of design. Bernard Tschumi's (1996) contribution in the architectural terminology and implementation is evident. As Suha Özkan mentions (Özkan, 2000: 25-35) what is expected from him is bring in structures that compound ideas with life. The way Tschumi turns knowledge into real practices through built examples is leaving traces for the generations to come.

Conclusion
The most significant outcome of this study is exposing critical reading skill as positive method in superposing it with architectural visualization for understanding the architectural theory book. This study also proves that in the modern society where education and knowledge is treasured, the skill of producing and using knowledge is not only possible by reading but also by thinking and criticizing. The importance of verbal language is of course undeniable, verbal and visual communications must intertwine. An architectural studio, carried

out by this method, would offer a preparatory training that promotes creative thinking and teaches to question the complex structure of design from different perspectives.

It is a fact that the quality drops by years on every level of the educational system and in order to reverse this drop, different educational methods should be tried to promote creativity by providing creative thinking skills. Activities in universities must be arranged in order to motivate the students to read and research. Reading environments that would be organized regarding the interests and needs of students must be offered to them in a way to demonstrate reading as a need. In this respect, this study contributes to literature in recognition of the positive contributions from not only architectural discipline and studies but also different fields of social sciences on the relevance of architecture and space.

This study is an indicator of the learning outcome that is knowledge based understanding, comprehending and acquiring the knowledge of spatial behaviour patterns. It is essential to interpret and reinterpret and make architecture with dynamics existing in all times, in parallel with these conglomerating consistent or contradictory ideas, discourses and theories that prove the efficiency of critical approach. The study also gives clues to future studies with a new method proposal that will contribute to architectural studio education.

References
Alexander, C., Ishikawa, S., Silverstein, M., iRamió, J.R., Jacobson, M., & Fiksdahl-King, I. (1977). *A Pattern Language*. Gustavo Gili.

Arnheim, R. (1969). *Visual Thinking*. University of California Press.

Aşılıoğlu, B. (2008). Bilişsel Öğrenmeler için Eleştirel Okumanın Önemi ve Onu Geliştirme Yolları. *D. Ü. Ziya Gökalp Eğitim Fakültesi Dergisi*, 10, 1-11.

Attoe W. (1978). *Architecture and Critical Imagination*, New York, John Wiley & Sons.
Aydınlı, S., (2001). Mimarlık Eğitiminde Öncelikler, *Mimar-ist*, Ocak 2001, 116-120.

Barthes, R. (2005). *Göstergebilimsel Serüven*, çev. Mehmet Rifat ve Sema Rifat (4. Basım). İstanbul: YKY.

Barthes, R. (2015). *Yazı ve Yorum*. çev. Tahsin Yücel (4. Basım). İstanbul: Metis.

Barnard, M. (2002). *Sanat, Tasarım ve Görsel Kültür*. Ankara: Ütopya Yayınevi.

Berger, J. (1972). *Ways of Seeing*, London: British Broadcasting Corporation and Penguin.

Boydak, A. (2001). *Öğrenme Stilleri*, İstanbul: Beyaz Yayınları.

Buehler, M. (2000). *Conceptualizing Distance Learning & Info Literacy*. Lacuny Institute 2000, http://wally.rit.edu/information/CUNY2000/sld008.htm, 10/08/2002

Cervetti, G., Pardales, M. J. ve Damico, J. S. (2001). *A Tale of Differences: Comparing the Traditions, Perspectives, and Educational Goals of Critical Reading and Critical Literacy*. Reading Online, 4 (9).
http://www.readingonline.org.html

Cross, N. (2006). *Designerly Ways of Knowing*, London: Springer.

Driver, R., Leach, J., Millar, R., and Scott, P. (1996). *Young People's Images of Science*. Buckingham: Open University Press.

Durmuş, S., Öymen Gür, Ş. (2017). MimarlığIn Metinsel Temsilinde Retorik İnşa: Usûl-Ii Mimari-l Osmanî, *METU JFA*, 2017/1, (34:1) 107-131.

Erdem, E., Yılmaz, A. and Özyalçın Oskay, Ö. (2009). The Effect of Concept Mapping on Meaningful Learning of Atom and Bonding, World Conference on Educational Sciences 2009. *Procedia Social and Behavioral Sciences*, 1586–1590.

Ersoy, A. (2013). Arkitera Köşe Yazısı, Mimarlık Tarihi Söyleşileri.
[http://www.arkitera.com/soylesi/index/detay/mimarlik-tarihi-soylesileri-- ahmet-ersoy/510]

Freire, P. (2014). *Yüreğin Pedagojisi* [Pedagogy of the Heart]. (Trans: Ö. Orhangazi). Ankara: Ütopya Yayınevi.

Gassat, J.O. (1998). *Üniversitenin Misyonu*, Çev: Neyyire Gül Işık, Yapı Kredi Yayınları, 45.

Günay, Doğan V. (2003). *Metin Bilgisi.* Genişletilmiş 2. Baskı, İstanbul: Multilingual.

Gür Ş.Ö. (2009). *Mimarlıkta Eleştirinin Eleştirisi*, Mimarlık, 348.

Güzer A. (2009). Kültürel Çatışma ve Süreklilik Alanı Olarak Mimarlık Eleştirisi, *Mimarlık*, 348.

Hartman, D. K. and Hartman, A.J. (1993), Reading Across Texts: Expanding the Role of the Reader, *The Reading Teacher*, 47 (3): 202-211.

Hays, K. M. (2002). *Architecture Theory Since 1963*, 3. Edition, Cambridge, Massachusetts: MIT Press.

İnceoğlu, M. and İnceoğlu, N. (2004). *Mimarlıkta Söylem Kuram ve Uygulama*, İstanbul: Tasarım Yayın Grubu.

Karakuyu, Y. (2010). The Effect of Concept Mapping on Attitude and Achievement in Physics Course. *International Journal of the Physical Sciences*, 5 (6), 724-737.

Lefebvre, H. (2014). *Mekanın Üretimi* (The Production of Space). çev. Işık Ergüden. İstanbul: Sel Yayıncılık.

Lenski, S. D. (1998). Intertextual Intentions: Making Connections Across Texts, *Clearing House*, 72 (2):74-75.

Messaris, P. (1994). *Visual Literacy: Image, Mind, and Reality*, Westview Press; 1st edition.

Mitchell, W. J. T. (1986). *Iconology: Image, Text, Ideology*. Chicago and London: The University of Chicago Press.

Nakhleh, M. B. (1994). Chemical Education Research in Laboratory Environment. *Journal of Chemical Education*, 71 (3), 201-205.

Nesbitt, K. (1996). *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995*, ed. Kate Nesbitt, New York: Princeton Architectural Press.

Novak, J. D. & Cañas, A. J. (2008). The Theory Underlying Concept Maps and How to Construct and Use Them, Technical Report IHMC Cmap Tools 2006-01 Rev 01-2008, Florida Institute for Human and Machine Cognition.

Novak, J. D. and Gowin, D. B. (1984). *Learning How to Learn*. New York: Cambridge University Press.

Novak, J. D. & Musonda, D. (1991). A Twelve-year Longitudinal Study of Science Concept Learning. *American Educational Research Journal*, 28 (1), 117-153.

Oluk, N.T., Kan, A. ve Ekmekci, G. (2016). Kavram Haritası Yöntemine Yönelik Tutum Ölçeğinin Geliştirilmesi: Geçerlik ve Güvenirlik Çalışması, *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi* (KEFAD) Cilt 17, Sayı 1, Nisan 2016, 95-110.

Okebukola, P. A. (1992). Attitude of Teachers Towards Concept Mapping and Vee Diagramming as Meta Learning Tools in

Science and Mathematics, *Educational Research*, 34 (3), 201- 213.

Onur, D., Zorlu, T. (2017). Tasarım Stüdyolarında Uygulanan Eğİtim Metotları ve Yaratıcılık İlişkisi, *The Turkish Online Journal of Design, Art and Communication - TOJDAC* October 2017 Volume 7 Issue 4, 542-555.

Öğrenme Biçimi Olarak Tasarım: Okullar Okulu Bienali Okumaları, (1998). İKSV Yayınları.

Özdemir, E. (2011). *Eleştirel Okuma*. Ankara: Bilgi Yayınevi.

Özkan, S. (2000), *Tschumi Üzerine, Bernard Tschumi Çağdaş Dünya Mimarları Dizisi 1*, İstanbul: Boyut Yayınları, 25-35.

Özsoy, V., Mamur, N., & Sarıbaş, S. (2020). Use of Visual Culture in Visual Arts Courses: Opinions of Participating Teachers after TUBITAK-4005 Project. *Pegem Eğitim ve Öğretim Dergisi*, 10(3), 767-808. http://dx.doi.org/10.14527/pegegog.2020.025

Parsa, A.F. (2007). İmgenin Gücü ve Görsel Kültürün Yükselişi, *Fotografya Dergisi*, 1-10.

Pearlman, B. (2009). Making 21st Century Schools: Creating Learner-centred School Places/workplaces for a New Culture of Students at Work. *Educational Technology*, 49 (5), 14-19.

Rye, J. A. & Rubba, P. A. (1998). An Exploration of the Concept Map as an Interview Tool to Facilitate the Externalization of Students, Understandings about Global Atmospheric Change. *Journal of Research in Scıence Teachıng*, 35 (5), 521–546.

Ricoeur, P. (1971). The Model of the Text: Meaningful Action Considered as a Text, *Social Research Journal*, 38 (3): 529-562.

Rose, G. (2001). *Visual Methodologies*. London: Sage Publication.

Rowe, D. W. (1987). Literacy Learning as an Intertextual Process, edt. J. E. Readence & R. S. Baldwin. Research in Literacy: Merging Perspectives: Thirty-Sixth Yearbook of the National Reading Conference Rochester. NY: National Reading Conference.

Ruiz-Primo, M. A., Schultz, S. E., Li, M. & Shavelson, R. J. (2001). Comparison of the Reliability and Validity of Scores from Two Concept-mapping Techniques, *Journal of Research in Scıence Teachıng*, 38 (2), 260- 278.

Sarıca, R. ve Çetin, B. (2012). Öğretimde Kavram Haritaları Kullanımının Öğrencilerin Akademik Başarısına ve Kalıcılığa Etkisi. *İlköğretim Online*, 11(2), 306-318.

Scardamalia, M. & Bereiter, C. (2014). Education for Innovation: Beyond "21st Century Skills". *Educational Technology*, 54 (1), 61-63.

Siegel, M. (1984). Reading as Signification. Unpublished Doctoral Dissertation, Indiana University, Bloomington.

Şentürer A. (2004). *Mimarlıkta, Estetikte, Tasarımda, Eğitimde Eleştirel Yaklaşım*, Yapı-Endüstri Merkezi Yayınları, İstanbul.

Tanrıverdi, G. ve Demirbaş, M. (2012). Fizik Laboratuarına Yönelik Tutum Ölçeği Geliştirme: Geçerlik ve Güvenirlik Çalışması, *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 13(3), 83-101.

Tanyeli, U. (1999). Söylem ve Kuram: Mimari Bilgi Alanının Sınırlarını Çizmek. *Mimarlık*, (289), 38-41.

Tanyeli, U. (2017). *Yıkarak Yapmak: Anarşist Bir Mimarlık Kuramı için Altlık*. İstanbul: Metis Yayınları.

Taşkın, Ö. (2006). *Fen Bilgisi Eğitiminde Özel Öğretim Yöntemleri*. Samsun, Türkiye: Deniz Kültür.

Tavin, K. M., & Anderson, M. (2003). Teaching (Popular) Visual Culture: Deconstructing

Disney Iin The Elementary Art Classroom. *Art Education*, 50 (4), 41-46.

Tekeli, İ., (2014). Mimarlık Eğitimi, Türkiye Yükseköğretim Stratejisi Bağlamında Mimarlık Eğitimi Üzerine Düşünceler, Mobbig 38 Toplantısı konuşma metni.

Tschumi, B. (1996). *Architecture and Disjunction*. London: The MIT Press.

Toffler, A., Toffler, H., & Gibson, R. (2011). *Rethinking the Future: Rethinking Business Principles, Competition, Control and Complexity, Leadership, Markets and the World*. Hachette UK.

Uluoğlu, B. (2002). Mimarlık Bilgisinin Çifte Kimliği ve Kavramsallaştırılış Biçimi Üzerine. A. Şentürer, Ş. Ural ve A. Atasoy (Yayına hazırlayanlar), *Mimarlık ve Felsefe*. İstanbul: YEM Yayınları.

Vitruvius, P. (2005). *Vitruvius: Mimarlık Üzerine On Kitap*. (Çev. Suna Güven). Şevki Vanlı Mimarlık Vakfı Yayınları.

Warner, L. G. & DeFleur, M. L. (1969). Attitude as an Interactional Concept: Social Constraint and Social Distance as Intervening Variables Between Attitudes and Action. *American Sociological Review*, 34 (2), 153-169

Weiner, F. (2005). Five Critical Horizons for Architectural Educators in an Age of Distraction, EAAE PRIZE 2003-2005, 21.

Williams, R. (2018). *Anahtar Sözcükler: Kültür ve Toplumun Sözvarlığı*. İstanbul: İletişim Yayınları.

Yalçın, S. (2018). 21.yüzyıl Becerileri ve Bu Becerilerin Ölçülmesinde Kullanılan Araçlar ve Yaklaşımlar. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*. 51 (1), 183-201.

Yıldırım, C. (2016). *Bilim Felsefesi*, 19. Basım, İstanbul: Remzi Kitabevi.

Yılmaz, B. (2004). Öğrencilerin Okuma ve Kütüphane Kullanma Alışkanlıklarında Ebeveynlerin Duyarlılığı. *Bilgi Dünyası*, 5(2), 115-136.

Yücel S. ve Aydınlı, S. (2015), Mimarın Eğitimi Üzerine Spekülatif Bir Deneme, *Erciyes Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 31(1):17-23

Yürekli, İ., Yürekli, H, (2004) Mimari Tasarım Eğitiminde Enformellik, *İTÜDERGİSİ/a*, Cilt 3, Sayı 1, 53-62.

Generation of Ceiling Rose Patterns by Shape Grammar Approaches in Safranbolu Traditional Houses

Ahmet Emre Dincer ⓘD
Faculty of Architecture, Karabuk University, Karabuk, Turkey
Selim Kartal ⓘD
Faculty of Architecture, Eskisehir Technical University, Eskisehir, Turkey

Abstract: This study aims to examine the ornament parts of the traditional ceilings, one of the essential elements of the space with physical and psychological aspects, in terms of design methods and approaches. In this study, the ceilings of the houses have been discussed in the Safranbolu region, which was chosen as the study area. Star-formed ceiling rose ornament, which is one of the indispensable components of these elements and is widely used in these houses, has been evaluated by shape grammar implementations that are commonly both generative and analytic tools for assessing design languages. By determining generation rules, a design process has been defined. With these rules, by using samples of present ceiling ornaments, variations have been generated in the frame of different scenarios. The richness and innovative sustainability of Star-formed ceiling rose ornament are demonstrated by the proposal of an analytic and generative approach based on inferences from traditional implementations. This study makes contributions to the literature by offering an alternative process to imitations and iterations of traditional architectural components and by enriching the design language of the craft implementations

Keywords: Shape grammar, Ceiling ornaments, Ceiling rose, Crafting, Traditional Safranbolu Houses.

1.Introduction

Ceilings are one of the most critical environmental components which have existed by the thought of space belonging to Turkish houses tradition in Anatolia. A ceiling as a top cover in a room design has been defined as a complementary of a bottom cover which has been formed by the functions needed in daily life. While the bottom cover is a space in which daily functions are realized practically, the top cover is conversely an abstracted product of ancient tradition (Küçükerman, 1973) (Figure 1).

It is seen that ceilings vary in different houses and other rooms of the same house. Ceilings have been designed in different ways and with aesthetic concerns according to the degree of importance of the room (headroom, kiosk room) in house, master's skill, owner's wishes, and economic power. In the main room, which is the largest room of traditional Turkish houses where the guests are accepted, adornment design is more intense than in the other rooms. Generally, the care and elaborative craftsmanship for the headroom has not been naturally shown for small spaces

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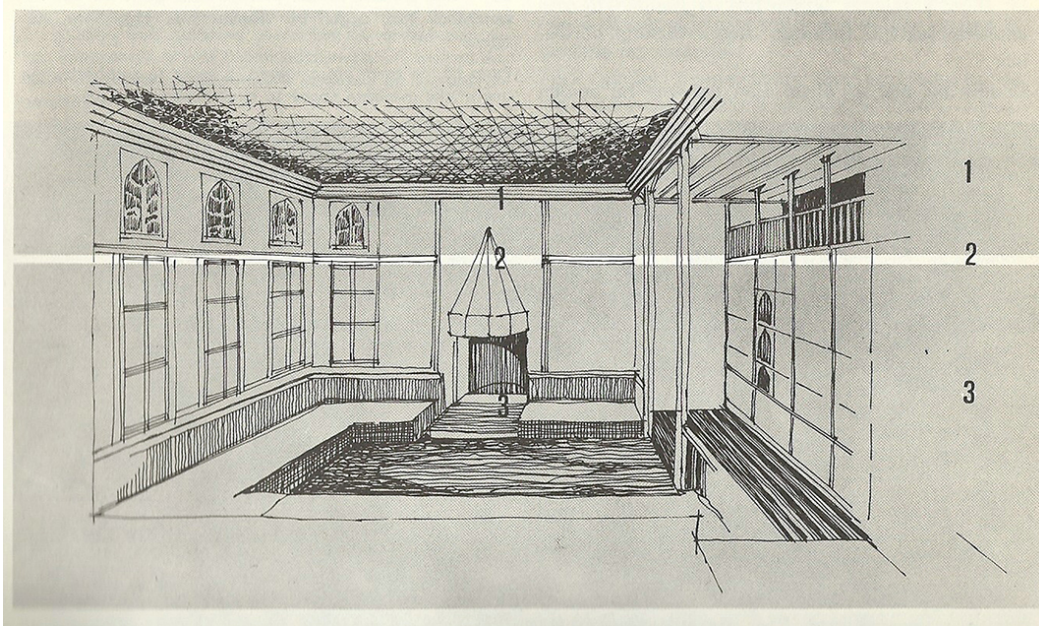
Figure 1: The abstracted top environment (1); The limit of functional space (2); and functional space (3) (Küçükerman, 1973).

, and the ceiling designs in these rooms have been made in a simpler way.

Turkish craftsmen have designed the ceilings, which are important in interior space, compatible style with the other components of the space like wall ornamentation, windows, and oven, and harmony with building characteristics. It has been tried to find a balance between the used and calculated motifs for each ceiling ornament. Besides the ornaments ordered by geometric repetitions, various birds, animal, flower motifs, and handcrafted carvings occur in the ceiling ornaments. While the edge-ornament elements are used at their edges, the ceilings are enriched by the ornament elements called a rose in its center (Erbüyür, 2003). In-ceiling
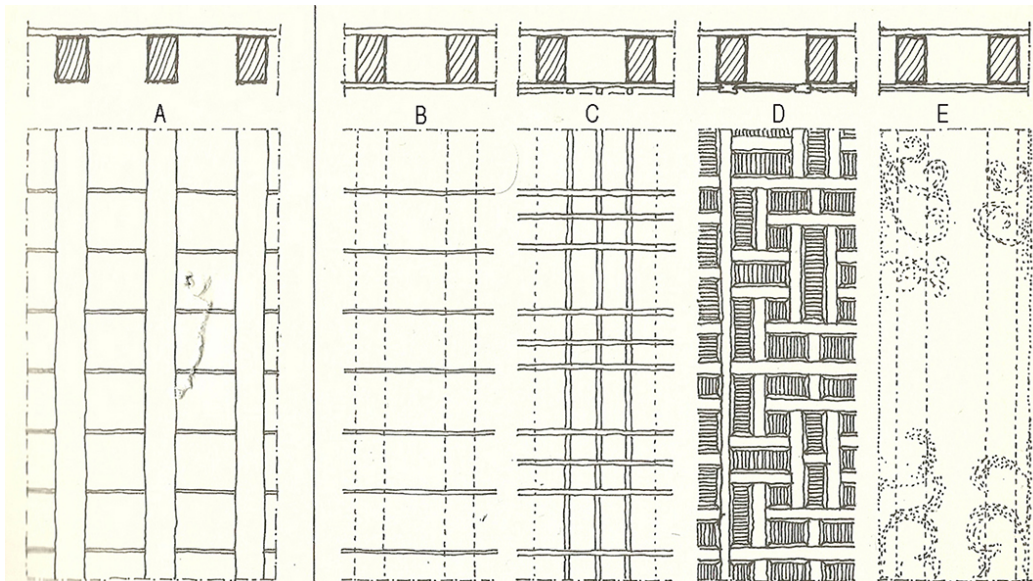
Figure 2: Application methods in-ceiling coverings: A) uncovering, B) Flat covering, C) Slatted covering, D) Tongued covering, and E) Painted covering (Küçükerman, 1973)

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ornaments, while the woods are preferred as a primary material, the materials like gypsum, chine, fabric, madder are also evaluated (İşler and Aras, 2013). One of the fields where wooden ornament art has been used intensively, the ceiling, has increased the aesthetic value of the space through both material and construction techniques. With wood crafting, unique samples have been created in, especially ceilings. In terms of the application techniques, Küçükerman and Güner (1995) sorted formation of ceiling claddings from simple to complex as uncovering, flat covering, slatted covering, tongued covering, and painted covering (Figure 2). Among them, slatted and tongued ceiling implementations are remarkable. Various slats form the covering under the ceiling beams in slatted ceiling implementations. It presents amenities and has become common due to opportunities for obtaining different variations by various solutions of slats. In tongued ceiling implementations, the bottom face of ceiling beams is covered by small wooden parts that are combined with tongue-and-groove joints in different types.

In the literature, the sections related to ceilings take place in the studies in the title of the traditional Turkish house. However, in these studies, the general characteristics of the traditional Turkish house are mentioned regionally. Among the studies based on only ceilings, the ceiling application techniques and the ornament style are generally explained (Aras et al. 2005; İşler and Aras, 2013; Yüksel and Yaz, 2016; İnce Gayberi and Neslihan, 2021). Thereby, there is no study on the generation of variations of the ceiling ornaments. However, the mathematical background, complex patterns, and repetitions of Islamic patterns, which have an intensive influence on artistic elements after Turks' conversion into Islam, have attracted the attention of researchers. When the ceiling ornaments are also examined, it is possible to see the presence of similar characteristics. So, it is worth analyzing ornament samples applied on these surfaces and generating variations that

lead to more unique models instead of imitations.

A sustainable future requires the continuity of any valuable socio-cultural heritage. A basic criterion of sustainability is the preservation of the traditional character (İsmailoğlu and Sipahi, 2021). Ensuring the sustainability of the handicrafts that existed in the past is one of them. Today, new technologies have replaced craftsmen (Hofverberg et al. 2017). With these new technologies, thanks to the applications made for centuries, geometric patterns that develop and take their source from a deep geometry knowledge and skill can be converted into a mathematical form and coded more easily and quickly. It also provides important opportunities for the development of new variations by examining existing geometric patterns. In particular, the use of contemporary techniques has an important place in understanding the geometric logics of the existing cultural heritage and transferring them to the future (Refalian et al., 2021). For this reason, the sustainability of crafts depends on their openness to innovation and similarly, it is a need to use technology for the continuity of ceiling decorations.

It is important to comprehend and develop the formal language which belongs to these patterns, whose intense similar repetitions and unconscious applications we encountered. Today, the commonly used digital design tools have contributed to analyzing and developing these patterns and increased craftsmens' vocabularies. In the scope of the study, in the frame of these opinions, the ceiling ornaments in Safranbolu where traditional patterns are intensive and the design language of rose ornaments, one of their main elements, by the approach of shape grammar are researched and their variations have been generated by the developed method. In this study, this process is introduced, and their results are discussed.

2.Corpus of the Ceiling patterns in Traditional Safranbolu Houses

Safranbolu, which is chosen as the study area, is a town in the Black Sea Region of Turkey and reflects the typical Ottoman City feature,

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so it has been included in UNESCO's World Heritage List since 1994. The old city has three regions which are Eski Çarşı, Bağlar, and Kıranköy. "Eski Çarşı" is a region where the houses were intensively used in winter. On the contrary, Bağlar is where summer residences were in the past. Kıranköy is near "Eski Çarşı" and a region where Greek minorities lived in time. There are about 1200 houses under the conservation in these regions. Therefore, there is a wide variety of samples in terms of ceiling ornament in these regions.

Ceiling craftmanship is paramount in Safranbolu and its surrounding area (Bayazıt, 2014a). The decoration has been taken care of and protected in headroom, sofas, some "iwans," and entrances of the low-ceilinged room. When creating patterns with slats, the ornaments with a ceiling rose in the center and quarter ceiling roses at the edges are typical (Bayazıt, 2014b). Bozkurt (2013) points out that vessel ceiling implementation is customary, the ceilings are usually square-shaped, and their central parts are ornamented by geometric patterns (circle or polygon shapes) in Safranbolu houses. Bozkurt expresses that their edges are arranged to support the significant effect, and techniques of carving or tongue-and-groove joints (called Kündekari in Turkish) are applied on these surfaces. Yıldırım and Hidayetoğlu (2006) pointed out that in Safranbolu, the ceilings of the houses, many of which belong to the 19th century, were usually ornamented by a technique named "çıtakari," which is one of the oldest known methods. The other methods were not much preferred.

In the past, in Safranbolu, until the population exchange process in 1923, Greek minorities and Turks lived together. Accordingly, there was a work-sharing between them. Turks mastered carpentry and woodwork when Greek minorities were interested in stonework (Günay, 1998). Naturally, there was an interaction between the two cultures. Therefore, there are naturally similar characteristics in the ceiling decorations in the housing types of both cultures.

Ornament organization of the ceilings consists of three sections. These are a ceiling rose, edges, and the middle part. In the houses in Safranbolu, it is possible to say that ceiling roses are two different forms which a star-shaped and polygon-relief. Moreover, the composition of edges and the middle part can be in various forms (rectangular, triangular, and hexagonal grids, etc.). However, this study focuses on ornaments of ceiling roses. As will be seen in the examples, among them, star-shaped ceiling roses are preferred.

3. Literature Review

Stiny and Mitchell (1978) explain the characterization of an architectural style with three functions which are to clarify common features in the corpus; to determine its criteria, and to present compositional mechanisms that are necessary to its new instances. In other words, it must satisfy the properties of being descriptive, analytic, and synthetic. In this context, the star-shaped ceiling roses, which are also common outside Safranbolu, have a specific design language with features repeated by specific elements and developable potentials.

Shape grammars are also a computational process used to analyze or design language development tools to solve existing design states (Knight, 1981; Çağdaş, 1996; Singh and Gu, 2012; Tepavcevic and Stojakovic, 2012). Shape grammars also contribute to the organization and computation of designs through rules based on physical factors for production (Sass, 2008). They comprise four components: shapes, a set of symbols, a set of shape rules, and an initial shape (Stiny, 1980). They are formal rewrite mechanisms in which shape rules ($\alpha \square \beta$) change the existing state, a Euclidean transformation of a shape ($t(\alpha)$) in design (C), by the other state, a new shape in the same transformation ($t(\beta)$). Whereby a new design ($C' = C - t(\alpha) + t(\beta)$) exists (de Klerk and Beirao, 2016). In shape grammar implementations, the degrees of predictability of emergent shapes are changeable. In this viewpoint, Knight (2003) divides shape grammars into three groups: anticipated, possible, and unanticipated emergencies. She

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puts analysis studies into the group of anticipated emergences. However, she said this grouping would change relatively to designers' comprehensiveness. In the literature, some studies incorporate Islamic patterns with this method. Some of them are as follow:

Cenani and Çağdaş (2006) generated variations from the basic shapes like a rectangular, pentagon, and triangle, and they used color parameters in some samples. Also, they exhibited 3D models of these samples in their other studies (Cenani and Cagdas, 2007). Çolakoğlu et al. (2009) examined the ornament model at Jaffa Gate and, by defining the initial parametric shape, obtained new shapes from it. Similarly, Bökü (2009) described the point grid layouts of ornament patterns in the existing buildings. After finding their initial parametric elements, she generated their similarities and variations by transformation rules on the grids; also, she made trials with changes between initial shapes and rules. Using the shape grammar method parametrically, Çolakoglu et al. (2008) analyzed the module, including an eight-pointed star rosette with four rhombuses. Ulu and Şener (2009) generated samples covering a square surface by using tie and bowtie, which are parts of a decagon. Jowers et al. (2010) researched the effects of emergence upon Islamic patterns by using different methods. In their study, they tried three ways: compass and rule, set-based and motif-based constructions. Motif-based construction was organized with shape grammar rules. In this study, there are rules like creating a grid system on a right triangle, recognizing, and identifying new lines in different types on the grids for a pattern, and then obtaining a unique grid pattern on a large scale from the right triangle by Euclidean transformations. Sayed et al. (2016) diversified three-dimensional motifs by using "n"-edged regular polygons as initial shapes. Agirbas (2020) studied 3D star polygon patterns that exemplify ornaments of tombstones in the Seljukian cemeteries by using shape grammar theory. In another study, Ağirbaş et al. (2022) also examined the formation of muqarnas plans at the main doors of some Ottoman-era mosques with a shape grammar approach by

associating them with the composition of unequal star forms.

In addition to these, Gips (1975) demonstrated the variations of the star form, frequently encountered in Islamic patterns, in the first applications of shape grammar through both shape and color rules. Furthermore, Hu et al. (2021) examined the examples of bronze drum in traditional batik patterns which have similar formal properties with a star shape by using shape grammars together with the artificial neural network approach.

Knight and Stiny (2015) stated that designing with shape grammars was related to moves of doing and seeing with essential spatial elements for making a shape. They focused on the idea of making instead of designing in a larger perspective. Accordingly, Making was defined as doing (drawing) and sensing (seeing) with stuff (line) to making things (shape). By this definition, shape grammars were adapted to making grammars. Making grammars make proposals for exploration of the spatial and temporal qualities and structural rules of making things (Knight, 2018). In making grammar, time is important and rules are separated into two parts which are sensing and doing rules. Craft practices comprise continuous and temporal actions and events. These are compatible with temporal and spatial segmentation logic in making grammar.

4.Materials and Method
In the study, firstly, the configurational features of ceiling roses which were chosen from the Safranbolu mansions were determined. Secondly, their close relationships with shape grammars and their practices were explained. Then, by evaluating the determined configurational features with a shape grammar approach, a generation model proposal has been developed. Finally, the generations of the model in which the initial shape is based on different existing ceiling roses have been made.

The data (technical drawings, photographs, etc.) about the houses in the study were obtained from literature research,

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communication with the architects and craftsmen following the restoration studies, talks with the authorities in Cultural Heritage Conservation Committee of Karabük, and mansion trips individually. Lists and locations of the examined houses are given in Figure 3.

4.1.Analysis of the ceiling rose patterns

A star form emerges with the combination of angular lines around an axis. In other words, a standard star form is obtained by way of multiplication of an angular line, rotation of its copies around an axis, and union of their open-ended points for completing 360°. Angular lines are in the forms of "V" or "Λ". Corner points of a star create circular borders. These borders define "trajectories" naturally. It is possible to reach a rectangular shape, a rhombus, or other polygons in a similar vein.

ESKİ ÇARŞI
1- A HOUSE IN HACI HALIL DISCRICT
2-YEDEKÇİOĞLU MANSION
3- HALO MEHMETLER (MEHVEŞ HANIM) MANSION
4-YÜZÜKÇÜLER HOUSE
5-SELVİLİ MANSION
6- MUAMMER KUZU HOUSE
7- MÜMTAZLAR MANSION
8-KARAHASANLAR NAZİFE HANIM MANSION
9-RAUF BEYLER MANSION
10-ZEHRA HORUZOĞLU HOUSE
11- A HOUSE IN KARAALİ DISCRICT
12- TURGUT REİS HOUSE
13-HACI HÜSEYİNLER HOUSE
14- HACI MEMİŞZADE HAMDİ EFENDİ MANSION
KIRANKÖY
15- ÜZEYİRLER (AHMET CAN) HOUSE
16-DEMİRKAPI MANSION
17-A HOUSE IN BARIŞ DISTRICT
18-MÜJGAN ŞENOL HOUSE
19-ÖMER YILDIZ HOUSE
BAĞLAR
20- RAŞİTLER VINEYARD HOUSE
21- ALİ KAVSAOĞLU HOUSE
22- GÖKÇÜOĞLU HOUSE
23- PAÇACIOĞLU MANSION
24- CİMCİMELER MANSION

Figure 3: List and locations of the chosen houses on the map of Safranbolu.

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At first glance of the examination of the existing samples, we can easily observe the existence of the series of hidden circular trajectories that lead to the creation of the star-shaped form of the ceiling roses.

These circular trajectories are visible with wooden slats in some examples. They provide the formation of intertwined stars. They have an essential effect on the complexity and the variety of the ceiling
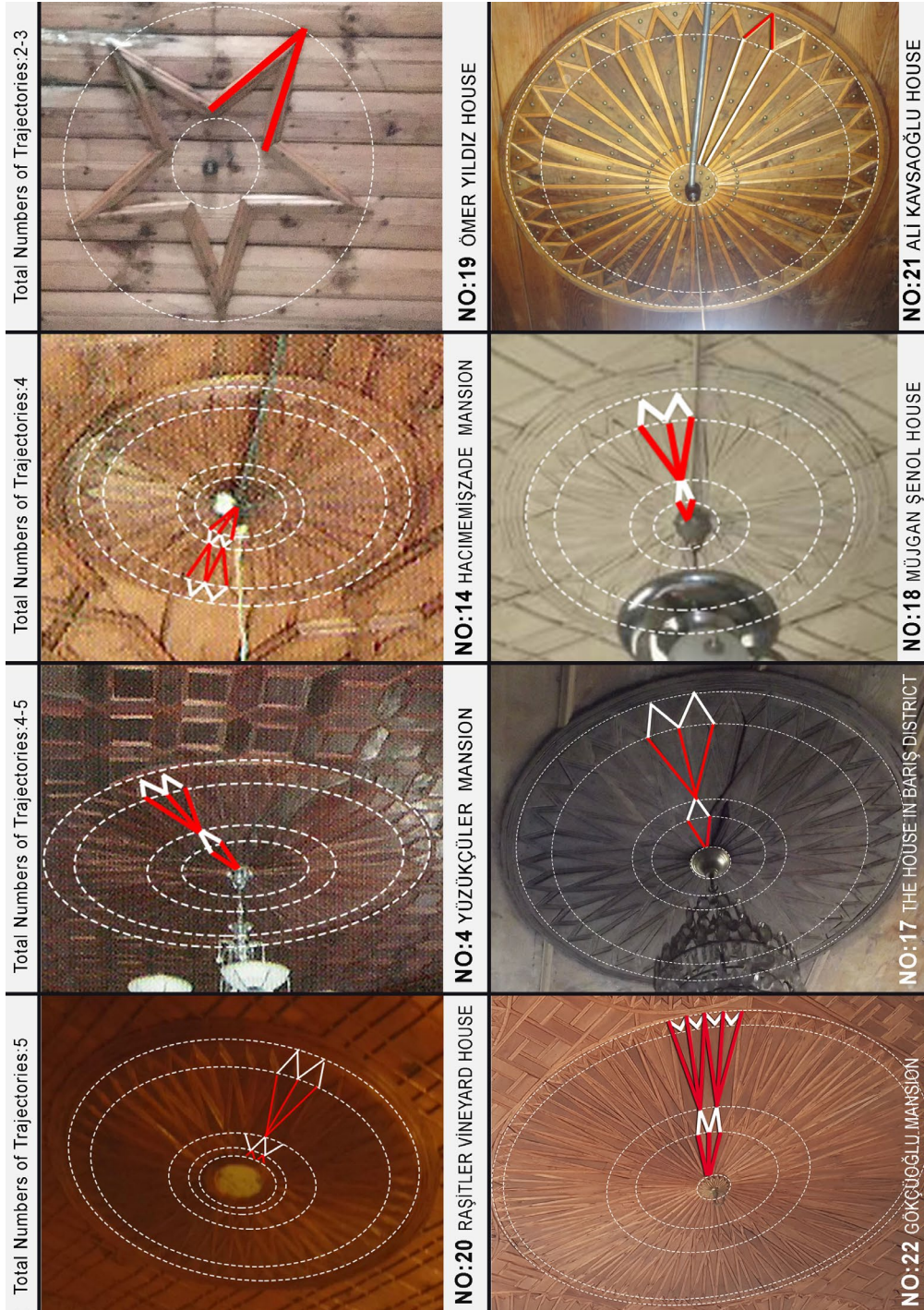
Figure 4A: The patterns of the ceiling roses in the Safranbolu Houses.

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roses with the numerical and dimensional differences between their elements besides defining the starting and the finishing processes of placement of wooden parts between themselves. In Figure 4A, 4B, and 4C the ceiling roses in the houses are listed according to the numbers of trajectories. The numbers of the trajectories are listed as 2,3,4,5 and 6.
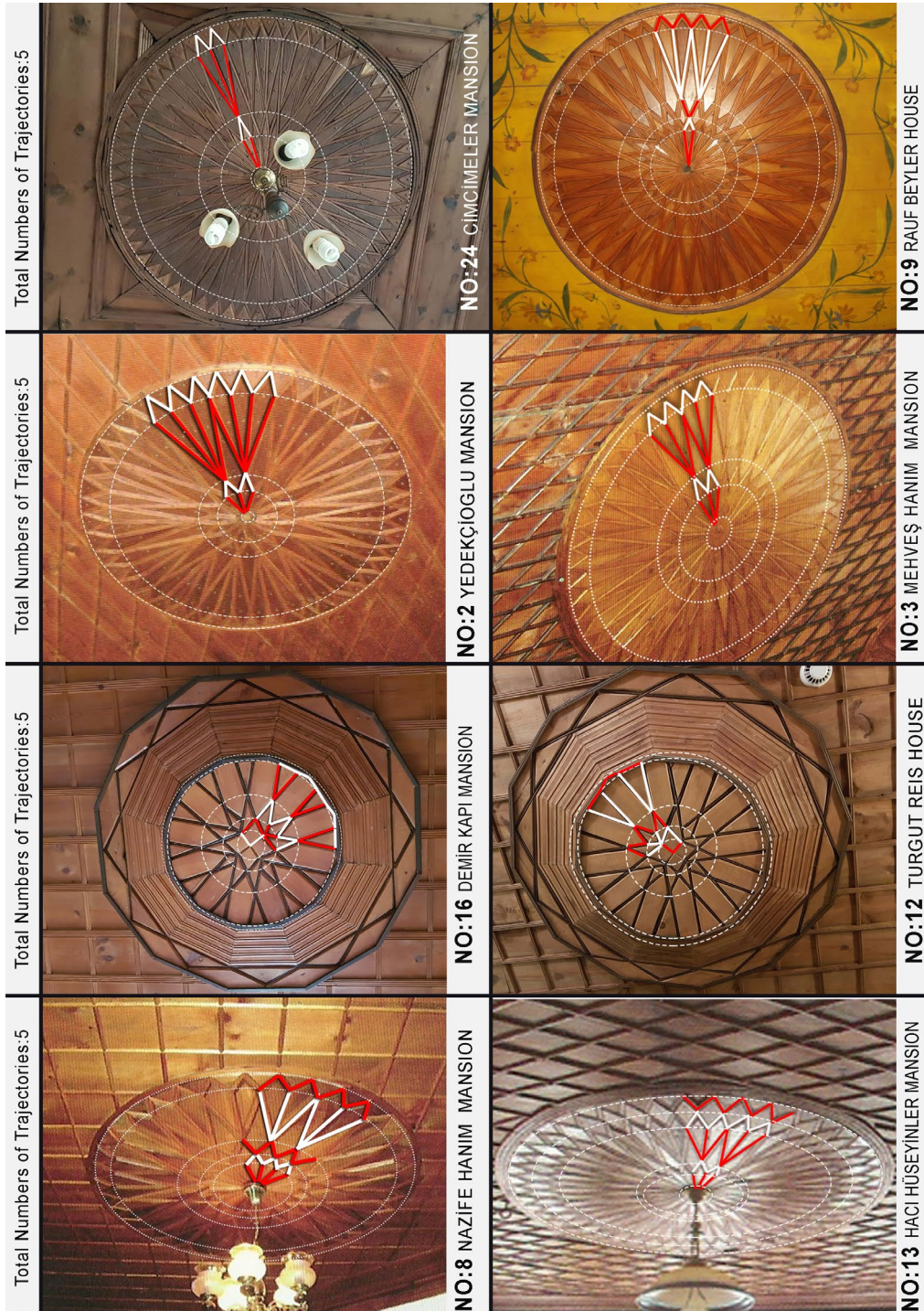
Figure 4B: *The patterns of the ceiling roses in the Safranbolu Houses.*

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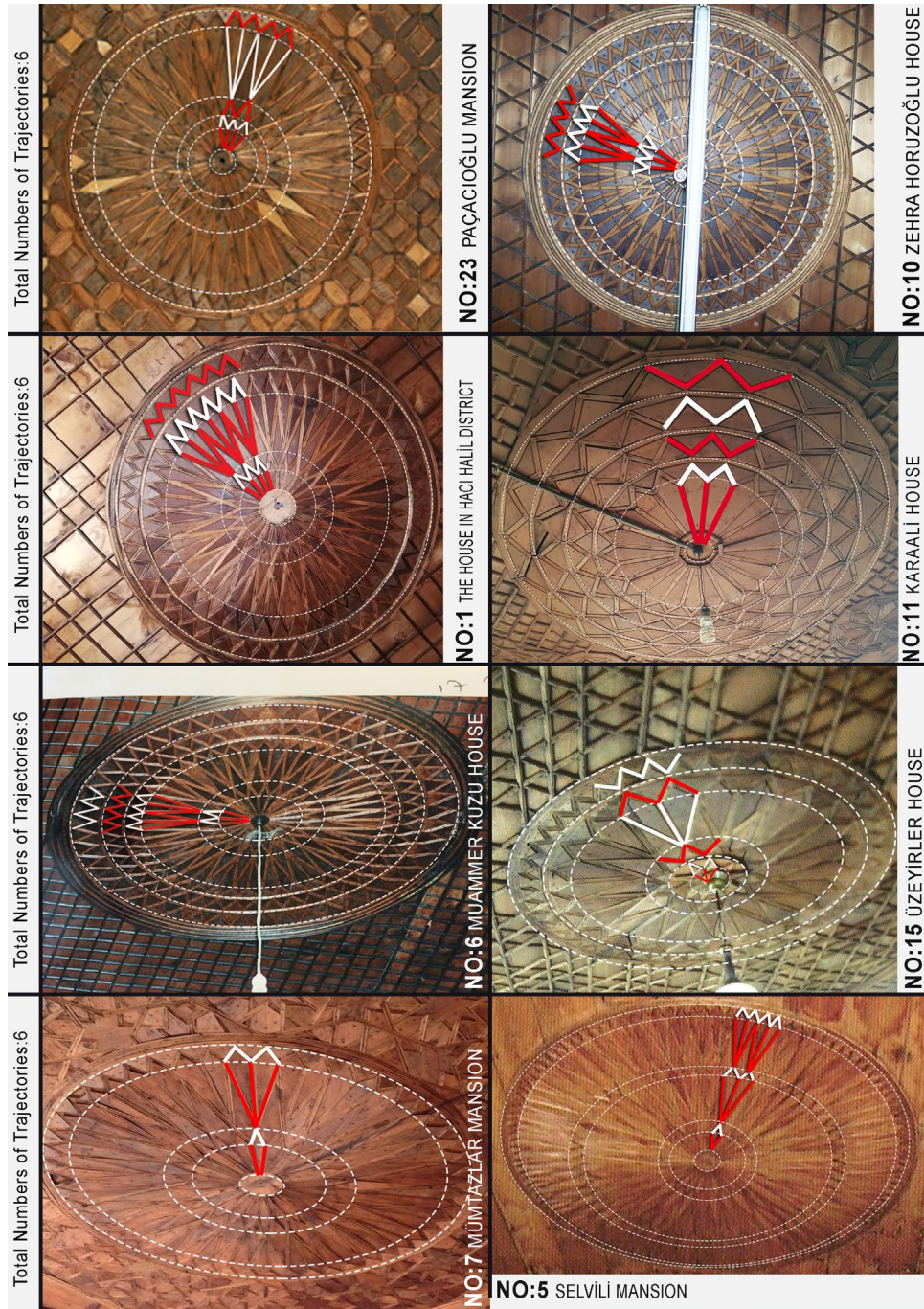
Figure 4C. *The patterns of the ceiling roses in the Safranbolu Houses.*

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Additionally, there are also differences in the organization of wooden materials that usually fill in the blanks among these trajectories with "V" or "Λ" shaped elements. These differences can be observed both numerically and formally. In the innermost circular trajectories of some samples there are no "V" or "Λ" shaped elements (See the Houses 1, 2, 3, 5, 7, 8, 11, 13, 17, 19, 20, 21, 22, 23, 24 in Fig. 4A, 4B and 4C). Also, in many of these samples, "V" shaped elements between the center points and second trajectories are trimmed by the first trajectories. Generally, if "V" shaped elements are placed on one trajectory, "Λ" shaped elements are positioned on the next trajectory. During the process, this logic continues cyclically. However, in House 22, it is seen that the placement of "V" shaped elements continues successively on the last two trajectories. Furthermore, due to the expanding dimensions and angles of "V" shaped elements, these elements are segmented by new smaller "V" shaped elements on some trajectories. Except for House 19 and 21, this application exists and usually results in double "V" shaped elements. While it seems on two separate trajectories in only House 5, "V" shaped elements are segmented into triple smaller "V" shaped elements in House 2. "V" or "Λ" shaped elements among the trajectories are usually connected via their endpoints or corner points, however, this rule is broken on the last trajectory in House 1 where the "V" or "Λ" shaped elements are not in touch with the others on the previous trajectory. Similarly, the corner points of some elements on the trajectory in House 15 are not connected to the elements on the previous one. Finally, in house, star-shaped and relief models were used together. Although these samples resemble the others, there are some differences due to combinations and intersections between relief and star-shaped polygons

4.2.Shape rules

As seen in the analyses of the examples, these patterns have or may have different variables even though they are usually like each other and there are some certain shape rules. Besides being programmed and parametric, they can be developed by adding new rules. These rules can be explained sequentially as follow:

Firstly, there is a rule for creating circular trajectories before a generation process (R_0). By this rule, circular trajectories are nested in one center. This rule determines the dimensions and numbers of the trajectories. Also, the total number of trajectories defines the termination rule (R_t) for a generation. Another rule based on circular trajectories is their visible or hidden states (R_1) (Figure 5A). This rule can be applied together with placements of "V" or "Λ" shaped elements or independently from them.
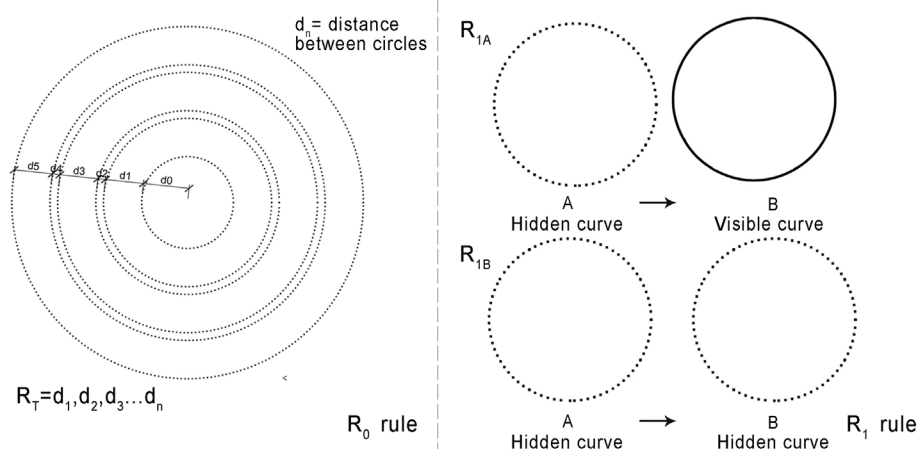

Figure 5A: Shape Rules for trajectories/circles

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Then, there are some rules for settling parts of a star shape on a trajectory. One of these rules is whether these basic parts exist between the initial trajectory and the CenterPoint of a model (R_2) (Figure 5B). In this study "V" or "Λ" shapes are evaluated as basic parts of a star, so the other rules are generated from these elements. If the R_2 rule is inactive, the initial "V" shape emerges between the initial trajectory and the CenterPoint (R_{3A}). Otherwise, the initial "Λ" shape emerges between the first and second trajectories (R_{3B}). Meanwhile, the angle value is defined for the initial "V" or "Λ" shape. After the placement of the initial shapes, the creation of new "V" or "Λ" shapes starts on the same trajectory (R_4) (Fig. 5C). This rule repeats until "V" or "Λ" shapes fill the gaps in a trajectory.

Optionally, after completing the placement of the shapes on a trajectory and before generating new shapes on the subsequent trajectory, the states of "V" shapes are evaluated, and new smaller "V" shapes can result from these shapes. For this, "V" shapes are segmented by a user-defined value (R_5). Additionally, the positions of the corner points of "V" shapes on the trajectory curve can be changed by a distance value according to the direction of each shape (R_6). Thus new "V"
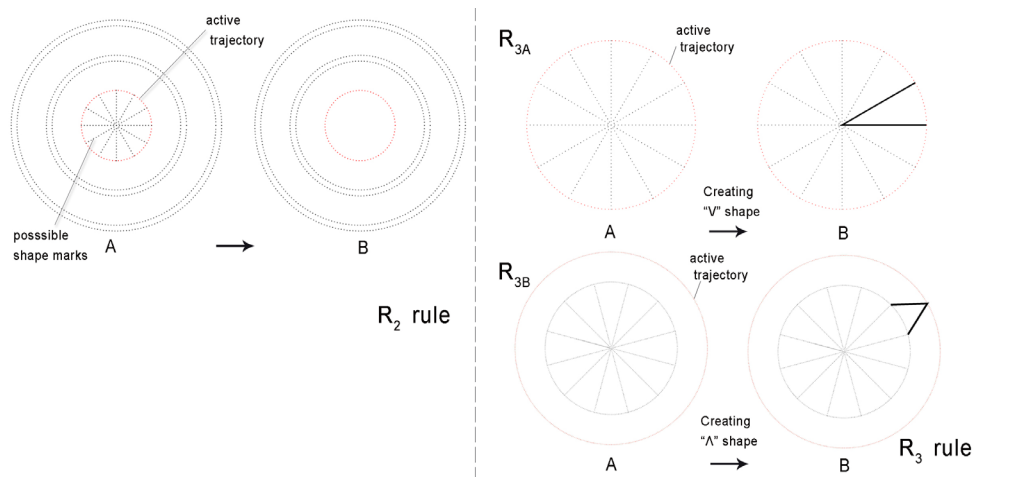
Figure 5B: *Creation of "V" or "Λ" shapes for starting.*
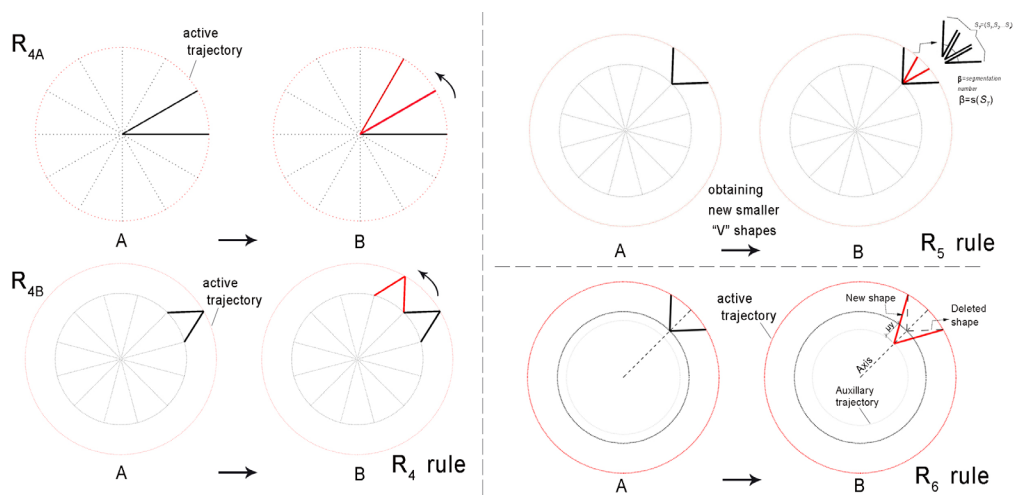
Figure 5C: *R_4, R_5, R_6 shape rules.*

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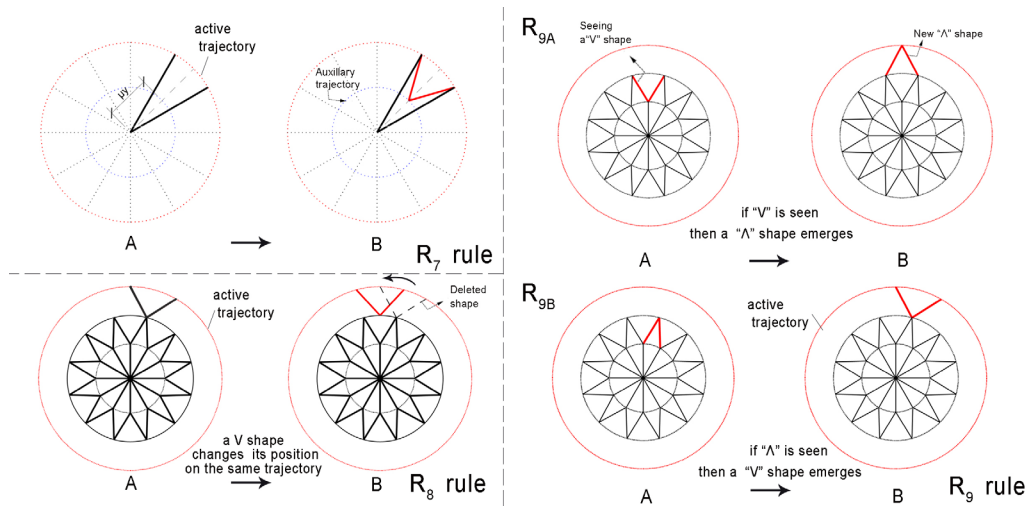
Figure 5D: *R$_7$, R$_8$, R$_9$ shape rules.*

shapes are obtained. Otherwise, new "V" shapes that are intricated with these V shapes can be created by the help of derivation of new auxiliary hidden curves from the active circular trajectory (R$_7$).

Furthermore, there is a displacement rule (R$_8$) in which these shapes can change their positions on the same trajectory (Figure 5D). When this rule is applied to one shape, it

repeats for the other shapes on the same trajectory. This rule is not applied to the shapes on initial trajectories.

In the transition from one trajectory to another one, according to states of "V" and "Λ" shapes on a previous trajectory, new "V" or "Λ" shapes are decided on the next one. If a "V" shape is selected, then a "Λ" shape exists on the next trajectory (R$_{9A}$). On the contrary, a

Figure 5E: *R$_{10}$, R$_{11}$ and R$_{12}$ shape rules.*

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"V" shape emerges in the case of a "Λ" shape on the previous one (R_{9B}). Dimensions and angles of new "V" or "Λ" shapes naturally change according to the distance between active and following trajectories.

There are also rules concerned with the elements apart from the "V" or "Λ" shapes. The "V" or "Λ" shapes on the same trajectories are usually connected. Nevertheless, disconnections between these shapes may emerge on the same trajectory. If there is such a situation in the previous trajectory, "II" shaped elements are determined among disconnected shapes. Accordingly, a new "Λ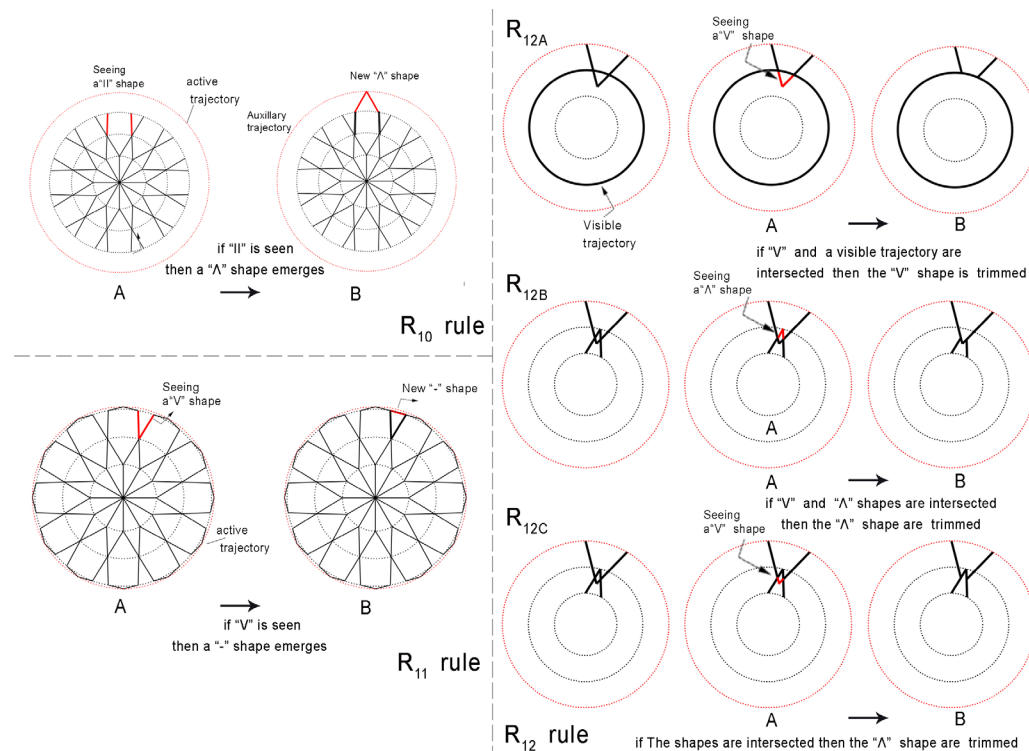" shape occurs on the active trajectory (R_{10}). Furthermore, one more rule can be used on the last trajectory to obtain a polygonal shape. This rule states that if there is a "V" shape on the previous trajectory, then "- "shape will emerge (R_{11}) (Figure 5E).

Finally, there are some intersection rules between "V" and "Λ" shapes and between "V" shapes and visible trajectories. Although some of them are not found in the existing samples, they have been added considering their possibilities. In these rules, if a visible circle intersects a "V" shape, a part of the shape inside the circle is erased (R_{12A}). Also, if "Λ" shapes intersect a "V" shape, then a part of the "V" shape inside the "Λ" shape is erased (R_{12B}) or a part of the "Λ" shape inside the "V" shape is erased (R_{12C}).

4.3. The generation process of the ceiling rose pattern

The algorithmic structure of the model, which applies the rules utilizing digital design tools can be explained as follows:

At the beginning of the process, the basic dimensions, and the numbers of the elements for hidden trajectories are defined. The dimensions are distances between intertwined circles (trajectories) which effect the variations. The sum of the distances which are entered for each circular trajectory determines the outer border of a star to be created. Also, the total number of dimension values represents the total number of trajectories and

naturally incremental process steps. These distances (d_0, d_1…d_4, d_n) are used as data inputs in the process. Thus, the creation of hidden trajectories (R_0) is completed.

There is a sequence of stages in the process. When stage 1 includes the applications between the CenterPoint and the first trajectory, stage 2 consists of the applications between the first and the second trajectories. Stage "n" defines the gap between $(n-1)^{th}$ and n^{th} trajectories. In stage 1, as stated before, If the R2 rule is inactive, the initial "V" shape emerges (R_{3A}) according to the angle value that the user defines. Then, next to the initial "V" shape, new "V" shapes are generated successively on the same trajectory (R_4) until the 360° radial cycle is completed. In this stage, new smaller V shapes can be generated from the V shapes or some part of them rhythmically (R_5). For this rule, segmentation value is defined by the user. Additionally, new "V" shapes may occur by changing the positions of the corner points of the shapes (R6). Furthermore, as stated before, the creation of new "V" shapes that are intricated with the existing V shapes can be realized (R7). In this rule, offset value (μy) is defined for the corner points of the new "V" shapes.

In Stage II, each one of the created "V" shapes is evaluated and "Λ" shapes occur around the new trajectory (R_{9A}). "Λ" shapes define an external border for a star. Optionally "V" shapes are detected on the border. R5, R6, or R7 rules are applied with their parameters on these shapes. In Stage III, "Λ" shapes are evaluated and "V" shapes are created by R_{9B} rule. If the inner angles of the created "V" shapes are equivalent to that of "Λ" shapes, the gaps between "V" shapes may emerge depending on the distance between the trajectories. These gaps may be filled with new "V" shapes (R_4). After this stage and R_5, R_6 or R_7 rules implementations, R_8 rule activates. With the rule, all "V" shapes change their positions around the trajectory. During the process, these iterative steps continue until the end of the stage n.

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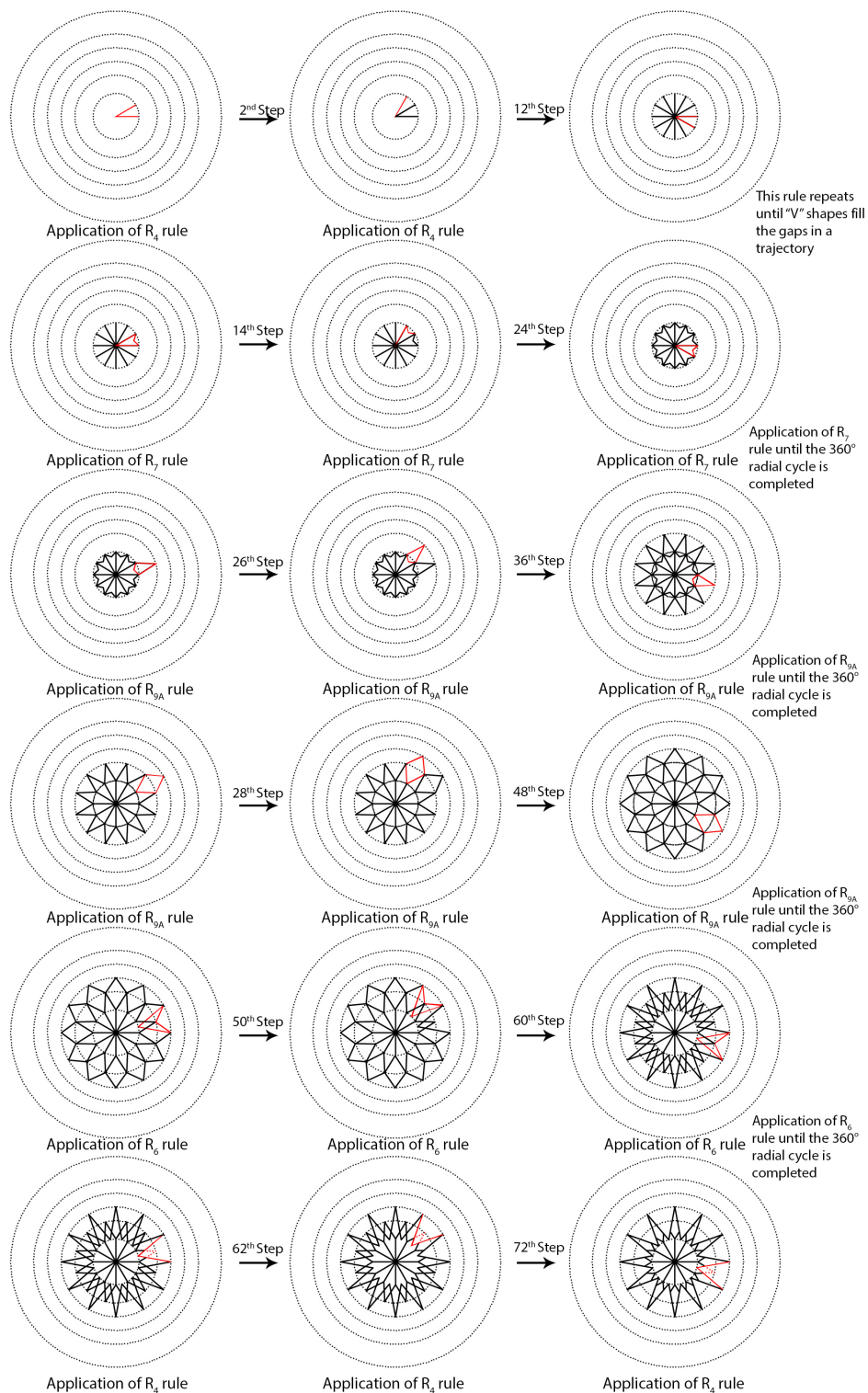
Figure 6A: The implementation process of the proposed model.

In stage I, if the R_2 rule is inactive, the first trajectory is invisible (R_{1B}), but the next trajectory becomes visible (R_{1A}). If the R_5 rule is applied in a stage, the outer trajectory will

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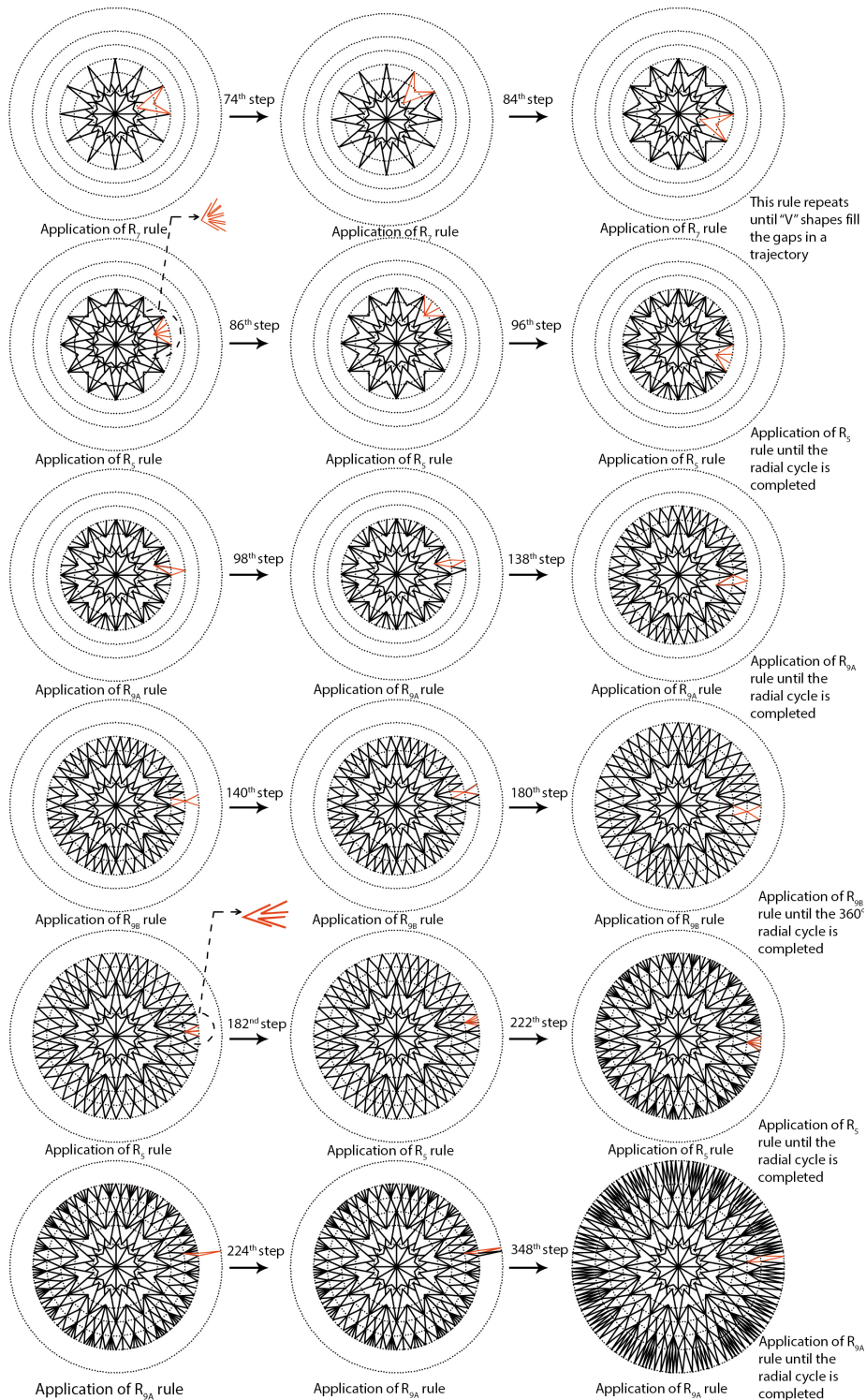
Figure 6B: The implementation process of the proposed model (Continued).

be invisible. On the contrary, the R8 rule is applied, and the active (inner) trajectory will be visible. During the process, while seeing "V", "Λ" and "II" shapes in the stages can be evaluated as "seeing" rules, drawing new ones

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according to the identified shapes exemplify "doing" rules.

In this study, there is an analysis approach on the ceiling roses, but it is considered that the developed model can present the alternatives which are difficult to predict because of combining the rules in the existing samples by different experiences and using multiple parameters. Therefore, it is possible to evaluate the results of this study in the group of possible emergences in Knight's classification (Knight,

2003).

4.4.The sample implementations generated by shape grammar

To facilitate measuring the possibilities of the potential offered in the decision-making process in the sample applications of the described procedure, trials of rules and parameters, from simple to complex, were made gradually. First, a simulation of the existing example with the defined grammar was made. Then its variational potentials were shown both by adding new ones from the
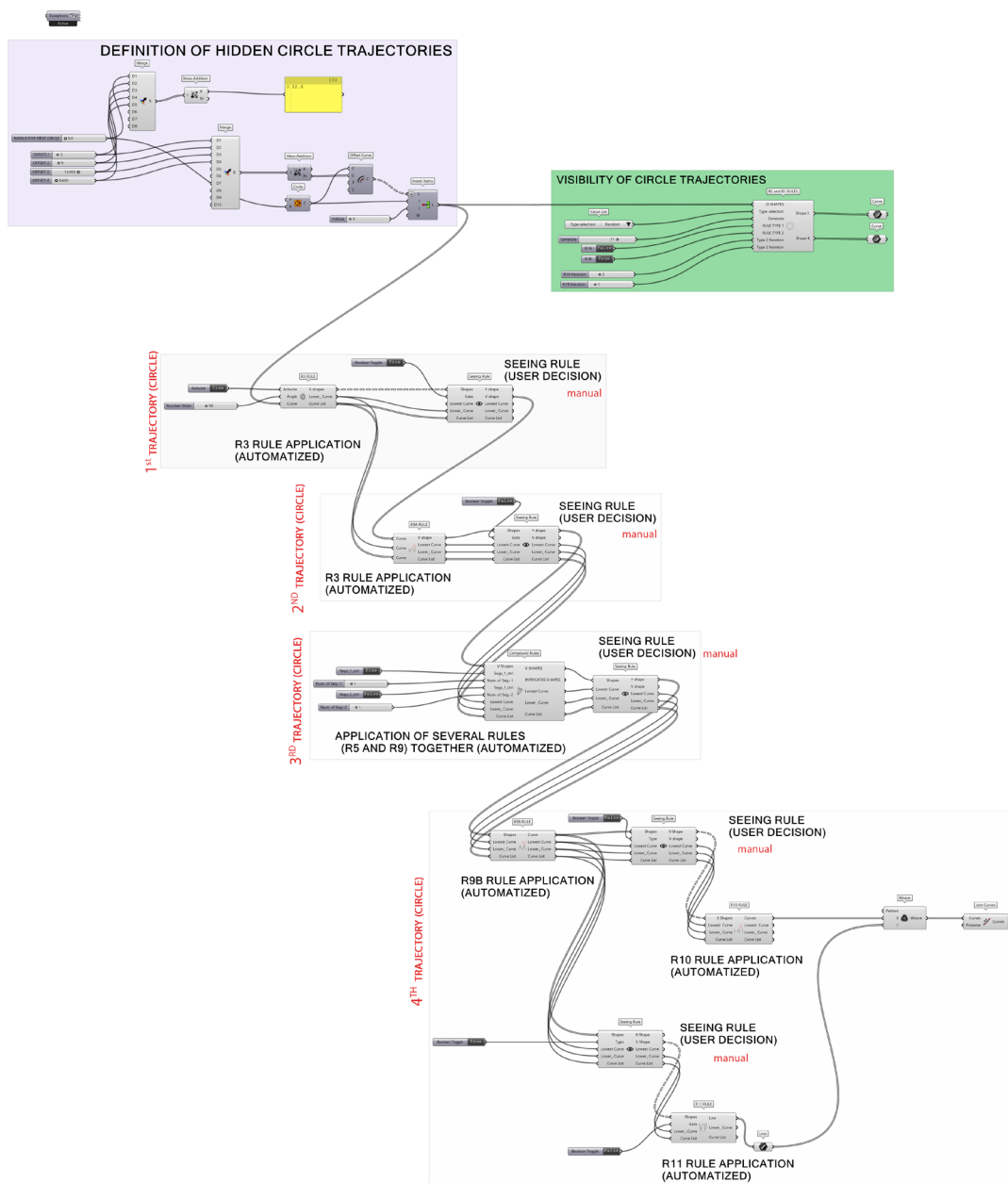
Figure 7: *The algorithm for the ceiling rose in House 16.*

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prescribed rules by changing the dimensional parameters in the existing structure. In the chosen example, the ones which differentiate from the others in terms of their configurations were handled.

In the examples of the first implementation (Figure 8), from top to bottom, the angle value of the "V" starting shape has changed. Then the iteration numbers of the R_5 rule have increased in the second circular trajectory, and

these numbers have differentiated rhythmically. Finally, distances between hidden courses are changed. From right to left, variations concerned with the visibility of the circles have taken place (the implementation of the R_1 rule).

There are four examples in the second implementation, whose processes are shown step by step in Figure 9. Unlike the previous one, these examples are not related to the
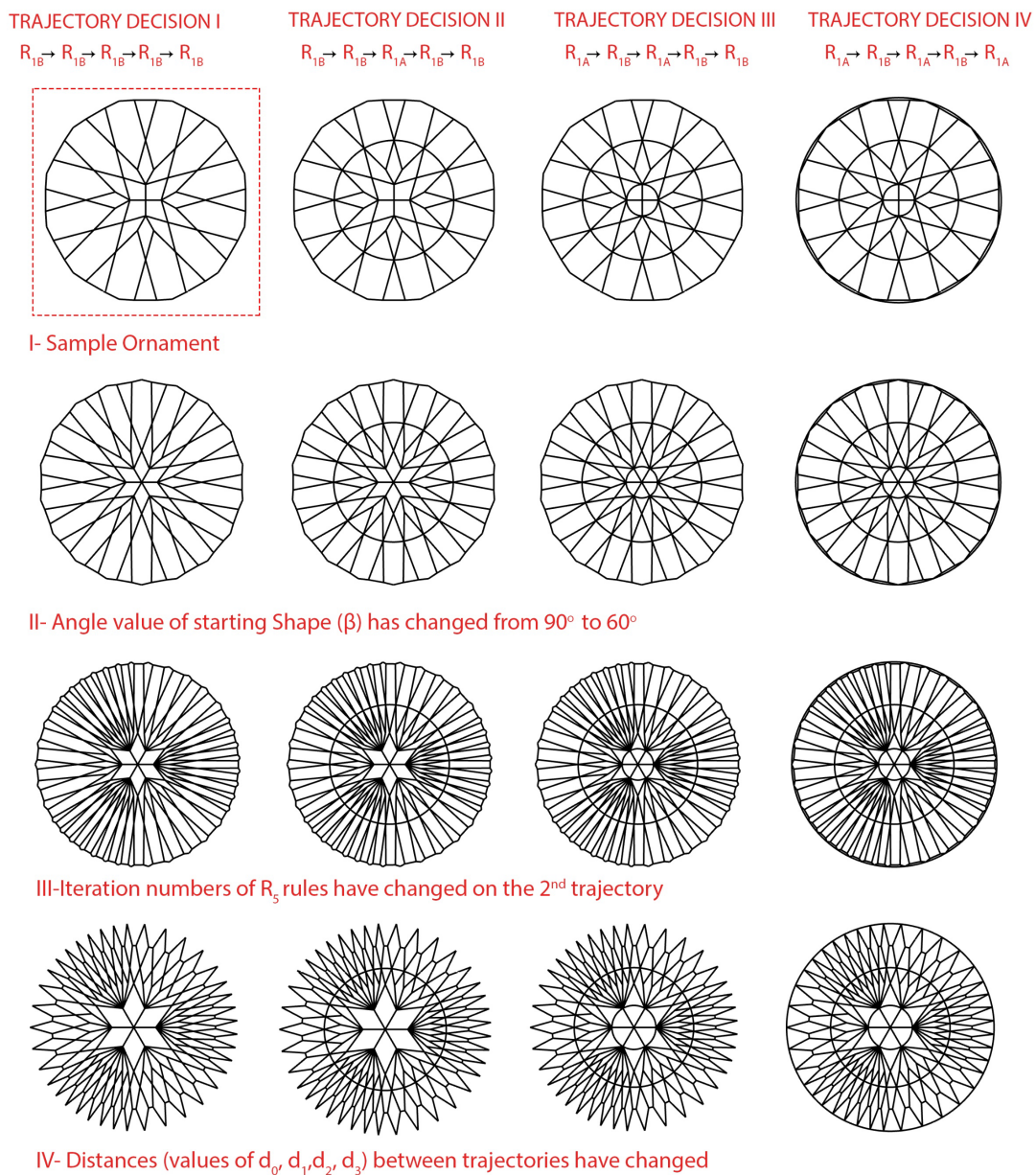
Figure 8: *The generated alternatives for the ceiling rose in House 16.*

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Figure 9: *The generated alternatives for a ceiling rose in the second implementation.*

existing ornaments. Conversely, the authors' own experiences have generated them. These examples are divided into two groups with visible trajectories (Example III and IV in Figure 8.) or no trajectory (Example I and II). In other words, the visibility of trajectories has been tested on two different star-shaped patterns. Although the similar rules are

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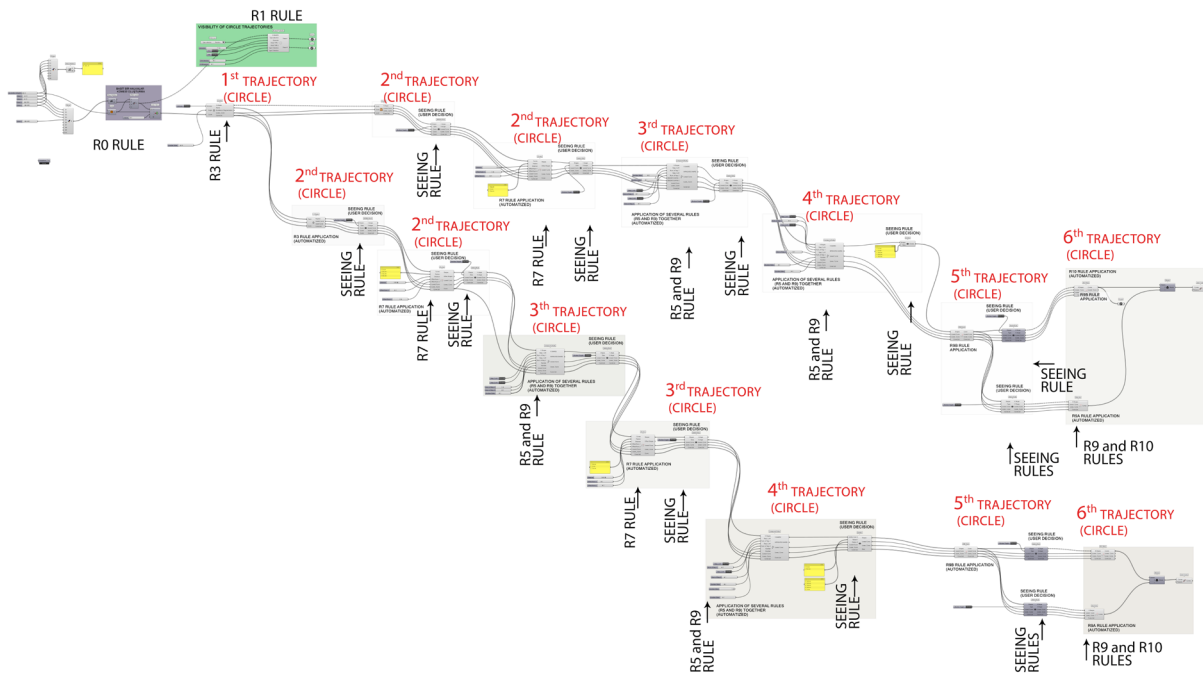
Figure 10: *The used algorithm for the examples in the second implementation.*

generally identical in the design of the star-shaped patterns, numbers, and types of the rules in the trajectories are partially differentiated. Another difference from the other implementation is that the steps/moves concerned with "Seeing the basic existing shapes" are reduced in the outer trajectories (See Stage IV in Figure 9).

5.Results

The application of the study refers to Schön's (1985) "Reflection in Action" approach. The steps like seeing "V", "Λ" or "Π" shapes, then deciding the creation of new figures from these shapes and keeping on these states with the created ones in this semi-automatized proposed model are like principles of this approach. The visual programming tools used in the proposed model have also facilitated intelligibility and adaptability.

R_1 rule has supported variations of ceiling roses. However, the efficiency of using the R_1 rule decreased reversely as the formal density of star-shaped ceiling rose increased. However, the efficiency can be increased further by changing the thickness of the material to be

chosen in the implementation and creating height differences among the visible circle trajectories.

The decreased angle of the initial rule (R_3) and the visually increased circle trajectories have resulted in ever-increasing formal density. The applications of R_5 have increased it much more. The visual efficiency evaluation of this density increase depends on the spatial conditions like the dimensions of the ceiling rose, space size, and functional states of spaces. For example, the examples with visual density may be beneficial for pure rooms surrounded by non-pretentious spatial elements. However, depending on individual evaluations, it is possible to say that this evaluation is somewhat relative.

Repeating the R5 rule and R7 in different numbers in the same orbit created a cyclic rhythmic visual density difference. Besides, the other rules that are not applied in these examples can also result.

While taking the symmetries of "V" or "Λ" shapes (R9 rules), the new ones may exceed

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the limits of the controlled circle trajectory. The trajectory could trim them. The trimmed ones may not be related to each other. However, together with seeing rules, these independent shapes extend the repertoire of pattern diversity. The implementations have also confirmed it.

Increasing the number of trajectories may cause extreme pattern density from inside to outside. However, as shown in the second implementation, this density can be decreased, and different and valuable patterns can be obtained by reducing the designer's ability to see "V", "II", and "Λ" shapes and to do new ones in each trajectory/stage. The scale of vision styles may differ.

6.Conclusions and Suggestions
In traditional houses in Safranbolu and Anatolian Cities, the ceiling ornaments include culture and richness like the other components of these buildings. The ornaments (of edges, middle area, and rose) of these surfaces where geometric forms were commonly used due to the material and cultural features are easily adaptable into digital media. In this study, the potential richness of the variations has been demonstrated in the framework of the ceiling rose by identifying general features/differences from existing examples and using shape grammar and a parametric approach.

When examining the mansions, some house ceiling ornaments were not found in their originals and were later added as copies or simple examples. It is understood that there is not enough consciousness on this subject. As stated before, it is more suitable for using newly added elements, which are innovative and unique but follow the traces of the past in these buildings. At least, evaluating alternatives is always helpful in every aspect (aesthetic, sustainability, innovations, etc.).

There are opportunities for ease of production and obtaining accurate products with digital fabrication. Today, specific standard patterns are produced relatively in this way. However, it is explicit that the richness of theoretical knowledge will also influence the practice. So,

by taking advantage of these digital design tools, it will be beneficial to develop designer-practitioner interaction in design areas where traditional qualities are maintained, but innovative approaches are also needed. As a result, a mutually correct and gradual interaction between designers' interventions/evaluations and automated processes with an exploratory approach will increase originality in these motif designs. Consequently, the presence of different interventions and systems, albeit a little, has been shown in the research of the samples. So, it is possible to say that innovative examples can be explored based on generations from the existing models.

The variations/generations on one type of only the ceiling rose ornaments have been made in this study. However, the ceiling rose is a part of the ceiling ornaments, and the others also have a potential for parametric variation and characteristic features. The developed rules for ceiling roses can be used for these parts of the ceiling ornaments by adding new rules. So, it is strongly likely to create and acquire much more different and rich samples together.

The rules and the applications are two-dimensional because so are the ornaments of star-shaped ceiling roses in Safranbolu. Similarly, new rules can be added, or existing ones can be adapted for two-dimensional surface elements and three-dimensional solid models. New seeing rules can be developed. Rule repertoire can be increased for two-dimensional wireframe implementations.

Professional practice carried out with the master-apprentice relationship has been abandoned over time, and most of the technical knowledge previously learned through on-site experience has been reduced to theory. Considering the requirements of the age, although it does not seem possible to return to a master-apprentice-based architectural education approach, it may be possible to provide an environment where professional skills are experienced by using VR toolkits. As a result, VR applications with three-dimensional models in various educational

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applications attract the attention of users (Şahbaz, 2021). Similarly, the approach of this study, which was developed in two dimensions, can be transferred to the third dimension and generalized in educational studies in VR environments. Thus, the sustainability of this craft, which is recommended to be developed with innovative approaches, can be ensured.

Finally, Knight (2018) suggests making grammar an alternative way of recognizing and representing craft practice and performance. Temporal steps of making activities present new perspectives on what has been done at that moment. The proposed approach of this study has exemplified it effectively with its sensing/seeing and doing activities. Hence it promotes the application of Knight's proposal to other traditional craft practices for sustainability.

References

Agirbas, A. (2020) 'Algorithmic decomposition of geometric Islamic patterns: a case study with star polygon design in the tombstones of Ahlat', *Nexus Network Journal*, 22, pp. 113–237. doi: 10.1007/s00004-018-0416-6.

Agirbas, A., Yildiz, G., and Sahin, M. (2022). Interrelation between grid systems and star polygons of muqarnas ground projection plans. *Heritage Science*, *10*(1), pp.1-26.

Aras, R., Budakçı, M. and Erbüyür, M. (2005) 'The Ceiling of the Traditional Turkish Houses in Kütahya and Emet.', *Journal of Polytechnic*, 8(1), pp. 81–86.

Bayazıt, N. (2014a) 'Safranbolu evlerinin plan tipolojisi ve kullanıcı ihtiyaçları hiyerarşisi', *Tasarım + Kuram*, 10(17), pp. 1–15. doi: 10.23835/tasarimkuram.239609.

Bayazıt, N. (2014b) *Safranbolu Geleneksel Konutları ve Toplumsal Değişme*. Safranbolu: Safranbolu Araştırmaları Merkezi Yayınları.

Bökü, A. (2009) *Biçim Grameri Türetme Yönteminin Anadolu Selçuklu Geometrik Bezemeleri Üzerinde Denenmesi (Örüntü Türetme Yöntemi Olarak Biçim Grameri).* Yıldız Tecnical University.

Bozkurt, S. G. (2013) 'Investigation at instance of Safranbolu houses of indoor montage in Ottoman domestic architecture in 19th century', *Journal of Istanbul University Faculty of Forestry*, 62(2), pp. 37–70.

Çağdaş, G. (1996) 'A shape grammar: The language of traditional Turkish houses', *Environment and Planning B: Planning and Design*, 23(4), pp. 443–464. doi: 10.1068/b230443.

Cenani, S. and Cagdas, G. (2006) 'Shape grammar of geometric islamic ornaments', in Bourdakis, V. and Charitos, D. (eds) *eCAADe 24 Conference Proceedings: Communicating Space(s)*. Volos, Greece, pp. 290–297. Available at: http://cumincad.architexturez.net/system/files/pdf/2006_290.content.pdf.

Cenani, S. and Cagdas, G. (2007) 'A shape grammar study: form generation with geometric Islamic patterns', in Soddu, C. (ed.) *Proceedings of 10th Generative Art Conference GA2007*. Milano, Italy: Domus Argenia Publisher, pp. 216–223. Available at: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:A+Shape+Grammar+Study+:+Form+Generation+with+Geometric+Islamic+Patterns#0.

Çolakoğlu, B., Yasa, A. and Avunduk, A. (2009) *Parametric Construction of Islamic Star Patterns/Rosettes: Jaffa Gate Rosette, Al-Quds/Jerusalem 2005 Program 2008 Report*. İstanbul.

Çolakoğlu, B., Yazar, T. and Uysal, S. (2008) 'Educational Experiment on Generative Tool Development in Architecture - PatGen: Islamic Star Pattern Generator', *eCAADe 26 Conference Proceedings: Architecture in Computro*.

Erbüyür, M. (2003) *The ceiling of the*

Journal of Design Studio, v:4 n:1
Dincer, A. E., Kartal, S., (2022), Generation of Ceiling Rose Patterns by Shape Grammar Approaches in Safranbolu Traditional houses

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traditional Turkish house in Kütahya and Emet. Gazi University.

Gips, J. (1975) *Shape Grammars and Their Uses: Artificial Perception, Shape Generation and Computer Aesthetics*, *Birkhauser Verlag*. Edited by Prof. Salomon Klaczko et al. Basel: Birkhauser Verlag. doi: 10.2307/1573793.

Günay, R. (1998) *Türk Ev Geleneği ve Safranbolu Evleri*. İstanbul: YEM Yayınları.

Hofverberg, H., Kronlid, D. O. and Östman, L. (2017) 'Crafting sustainability CRAFTING SUSTAINABILITY?', *Nordic Journal of Science and Technology Studies*, 5(2), p. 2017.

Hu, T. *et al.* (2021) 'Design of ethnic patterns based on shape grammar and artificial neural network', *Alexandria Engineering Journal*, 60(1), pp. 1601–1625. doi: 10.1016/j.aej.2020.11.013.

İnce Gayberi, Ş. and Neslihan, D. (2021) 'Wooden Ceiling Construction Techniques and Decorations of Traditional Urfa Houses', *Dicle University Journal of the Institute of Natural and Applied Science*, 10(2), pp. 133–146.

İsmailoglu, S. and Sipahi, S. (2021) 'Social sustainability of cultural heritage: Erzurum great mosque (Atabey mosque)', *Open House International*, 46(4), pp. 578–594. doi: 10.1108/OHI-12-2020-0173.

İşler E, Aras R. (2013) 'The ceilings of the traditional Turkish house in Kastamonu, Daday and Safranbolu', Journal of Akdeniz Sanat, 6(11), pp.166-180.

Jowers, I. *et al.* (2010) 'A study of emergence in the generation of Islamic geometric patterns', in Dave, B. et al. (eds) *New Frontiers - Proceedings of the 15th International Conference on Computer-Aided Architectural Design in Asia, CAADRIA 2010*, pp. 39–48.

de Klerk, R. and Beirao, J. N. (2016) 'Ontologies and Shape Grammars A Relational Overview Towards Semantic Design Systems',

in Aulikki, H., Toni, Ö., and Piia, M. (eds) *eCAADe 2016 Complexity & Simplicity Volume 2*. Oulu, Finland: eCAADe (Education and Research in Computer Aided Architectural Design in Europe) and Oulu School of Architecture, University of Oulu, pp. 305–314.

Knight, T. (1981) 'Languages of designs: from known to new', *Environment and Planning B: Planning and Design*, 8(2), pp. 213–238. doi: 10.1068/b080213.

Knight, T. (2003) 'Computing with emergence', *Environment and Planning B: Planning and Design*, 30(1), pp. 125–155. doi: 10.1068/b12914.

Knight, T. (2018) 'Craft, Performance, and Grammars', in Lee, J. H. (ed.) *Computational Studies on Cultural Variation and Heredity*. Springer Singapore, pp. 205–224. doi: 10.1007/978-981-10-8189-7.

Knight, T. and Stiny, G. (2015) 'Making grammars: From computing with shapes to computing with things', *Design Studies*, 41, pp. 8–28. doi: 10.1016/j.destud.2015.08.006.

Küçükerman, Ö. (1973) *The rooms in The Traditional Turkish House of Anatolia From the Aspect of Spatial Organization*. İstanbul: Türkiye Turing ve Otomobil Kurumu.

Küçükerman, Ö. and Güner, Ş. (1995) *Anadolu Mirasında Türk Evleri*. İstanbul: T.C. Kültür Bakanlığı Yayınları.

Refalian, G., Coloma, E. and Moya, J. N. (2021). Formal grammar methodology for digital visualization of Islamic geometric patterns. *International Journal of Architectural Computing*, 14780771211039079.

Sass, L. (2008) 'A physical design grammar: A production system for layered manufacturing machines', *Automation in Construction*, 17(6), pp. 691–704. doi: 10.1016/j.autcon.2007.12.003.

Sayed, Z. *et al.* (2016) 'Parameterized shape grammar for n-fold generating Islamic geometric motifs', in *Proceedings - 2015*

Journal of Design Studio, v:4 n:1
Dincer, A. E., Kartal, S., (2022), Generation of Ceiling Rose Patterns by Shape Grammar Approaches in Safranbolu Traditional houses

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International Conference on Cyberworlds, CW 2015. Visby, pp. 79–85. doi: 10.1109/CW.2015.54.

Schon, D. (1985) *The Design Studio: An Exploration of Its Traditions and Potential*. London: RIBA Publications for RIBA Building Industry.

Singh, V. and Gu, N. (2012) 'Towards an integrated generative design framework', *Design Studies*, (33), pp. 185–207. doi: 10.1016/j.destud.2011.06.001.

Stiny, G. (1980) 'Introduction to shape and shape grammars', *Environment and Planning B: Planning and Design*, (7), pp. 343–351. doi: 10.1068/b070343.

Stiny, G. and Mitchell, W. J. (1978) 'The Palladian grammar', *Environment and Planning B: Planning and Design*, 5(1), pp. 5–18. doi: 10.1068/b050005.

Şahbaz, E. (2021). SimYA: A virtual reality–based construction studio simulator. *International Journal of Architectural Computing*, 14780771211041777.

Tepavcevic, B. and Stojakovic, V. (2012) 'Shape grammar in contemporary architectural theory and design', *Facta universitatis - series: Architecture and Civil Engineering*, 10(2), pp. 169–178. doi: 10.2298/fuace1202169t.

Ulu, E. and Sener, S. M. (2009) 'A Shape grammar model to generate Islamic geometric pattern', in Soddu, C. (ed.) *Proceedings of the 12h generative art conference*, pp. 290–297. Available at: http://celestinosoddu.com/on/cic/GA2009Papers/p25.pdf.

Yıldırım, K. and Hidayetoğlu, M. L. (2006) 'A research on the varieties of the features and the construction techniques of the wooden ceiling decorations at the traditional Turkish houses', in *International Symposium of Traditional Arts*. İzmir, pp. 332–341.

Yüksel, N. and Yaz, Ü. (2016) 'Geç dönem tarihi Yozgat evlerinde görülen ahşap tavan örnekleri', *21. Yüzyılda Eğitim Ve Toplum Eğitim Bilimleri Ve Sosyal Araştırmalar Dergisi*, 5(15), pp. 237–264. Available at: https://dergipark.org.tr/en/pub/egitimvetoplum/issue/32169/356936 (Accessed: 18 May 2020).

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Transferring Experience in Industrial Design Studio Education

Gizem Bodur   iD
Department of Industrial Design, Faculty of Fine Arts, Design and Architecture, Atılım University, Ankara, Turkey
Dilek Akbulut   iD
Department of Industrial Design, Faculty of Architecture, Gazi University, Ankara, Turkey

Abstract: Design studio courses are the basis of industrial design education. The product design projects carried out by academic and private sector experienced full-time and part-time instructors are shaped inline with the domain and experience of the lecturers. Assessment criteria may also change with the content of each product design project implemented. Instructors convey the values and approaches they consider to the students through the teaching methods they prefer throughout the process. In the industrial design studio education, where teaching takes place through experience transfer, different types of experience and knowledge are brought together by instructors and students collaboratively throughout the process. Within the scope of the study, the different approaches of the full-time and part-time instructors in the project development processes in the product design studios were examined through the professional domains and experiences of the instructors in Turkey. In order to do so, a survey was conducted with both parties. The collected data were analysed with the Chi-Square Independence test, and significant relationships were determined between the experiences, teaching methods, and design process approach of full-time and part-time instructors carrying out the product design studio. Participants' opinions about design techniques, design assessments and shortcomings of education were listed in the table and the distributions of the answers were shown. In this direction, evaluations and suggestions regarding the transfer of experience in product design education have been shared.

Keywords: Industrial design education, Experience transfer, Industrial design studio, Teaching methods

1. Introduction

Design education is carried out with different methods performed by many partners. Through these multidisciplinary methods, design education aims to utilize particular knowledge acquired in professional life. Industrial design education provides a sustainable design practice infrastructure for students during their education and professional life with the versatile methods it applies (Lai & Peng, 2019; Kolko, 2005). Within the scope of the design education curriculum, it is aimed to convey values such as questioning ability, paradigm approach, system theories, communication competence, universal values, ethics, cultural and historical awareness, interest in technology, and environmental responsibility (Levy, 1990). The scope of the curriculum in industrial design departments is mass production, user- oriented product design and aesthetics. In a common curriculum structure, the operation of the design studio courses, which constitute the backbone of design education, may vary depending on the structuring origin and approaches of the faculties in which the industrial design department is affiliated (Er, Korkut & Er, 2003).

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Industrial design education starts with a basic design studio in the first year and continues with product design studios in the following three years, in Turkey (Er, Korkut & Er, 2003). In this paper, product design definition was used especially to separate product design studio from basic design studio during industrial design education. According to Schaar and Shankwiler (2008) industrial design students are expected to complete the product design process for a period of three years starting from the second- year undergraduate level, in the light of the information they receive in the basic design course. In the design studio, the cognitive abilities and hand skills of the students turn into a product output with the information that different studio instructors convey to them during the studio critiques (Schaar & Shankwiler, 2008). Ulrich and Eppinger (2012, p.14) defined phases of design process, that turning from cognitive abilities to product output, planning, concept development, system-level design, detail design, testing and refinement, production ramp-up. Industrial design process begins from planning to preparation for production in design education and professional design sectors (Yang, You & Chan,

2005). Accordingly, these phases include both designing and manufacturing experience for designers. In this paper design process was approached according to Ulrich and Eppinger's (2012, p.14) arrangement of phases, and it's accepted design instructors can have design and manufacturing experiences apart from each other according to define of Yang et al. (2005). Each new project in studio practice brings new design research and design knowledge. Manzini (2009) defines design knowledge as a collection of different cognitive works that have different purposes in terms of content. Design knowledge, which is clear, negotiable, transferable and collectable, should be clearly articulated by instructors, discussed, and applicable to design students. Thus, design knowledge, which can be called as the research findings, becomes the starting point for all studio participants to produce more information in the design process (Manzini, 2009). The findings of the research that the students

conducted, are re-examined by the instructors that aim to contribute more to students' design processes. At the same time, the different information collected by the students is verified and rich content is created with this information (Wong & Siu, 2012). At this stage of the studio process, the potential for mutual learning arises. Collaboratively, instructors and students share their knowledge and work to build the most efficient design process for the student (Lai & Peng, 2019). Collaborative learning is defined in the literature as students performing research, analysis, and evaluation processes together for the courses conducted with a student-oriented system (Laal & Laal, 2012). This method, which enables students to play an active role in conducting the course, encourages studio instructors to actively communicate with the student in design education (McMahon & Kiernan, 2011). In the industrial design studios, along with the students, the instructors conduct written and visual research on the subject of the project and exchange information make the information exchange continuously. Students also present their research by reconstructing them in their own way of understanding. For this reason, collaborative learning takes place not only among students, but also between studio instructors and students in design education (Eren, Korkut & Burgazlı, 2017).

The design knowledge and experience of the instructors who teach in studios and the methods of transferring these experiences determine the focus of education in the product design studio (Lai & Peng, 2019; Schön, 2017). Depending on whether the instructors are part-time or full-time in the faculty, their duties can also change the communication and teaching styles established by the instructors in the studio. In the literature, these variables were evaluated over the learning outcomes of the students and the differences of sectoral experiences between part-time and full-time instructors were examined (Kirker, 1990; Bolge, 1995; Burgess & Samuels, 1999; Rossol-Allison & Alleman Beyers, 2011). These differences were measured in terms of the instructor's way of teaching the lesson, them communication with the students, and the permanence of the information presented

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(Landrum, 2009). In addition, the effects of academic status differences on the university and faculty were evaluated financially and culturally (Glaskin-Clay, 2007). However, it is seen that these studies are carried out in educational areas with written and technical lecture forms. The fact that visual and drawing elements are dominant in art and design education, unlike these studies, causes the design education processes to be excluded from the results obtained in this context. Therefore different approaches of the part-time and full-time design instructors should be examined and create a research area about the transfer of design experiences.

Considering the literature, this paper claims that part-time and full-time studio instructors apply different methods for transferring experience and project assessment in design education. Within this scope, the methods of transferring experience and knowledge were tried to be investigated in industrial design education. The sample group consisted of full-time or part-time instructors participating in design studio courses in industrial design departments. Along with the preferred methods, different focal points in industrial design education were examined depending on the instructors' approaches.

2. Instructor's Experience in Industrial Design Studio

Experience and knowledge transfer happens in different ways during design process in the studio. Design knowledge transfer can be defined according to different knowledge perspectives of Liyanage, Elhag, Ballal and Li's (2009) knowledge transfer method. Industrial design students know and understand design via instructors, manipulate design knowledge, apply the expertise of instructors to their project, access to information and take the designing potential to action. These phases can happen in different ways depending on full-time and part-time instructors' approach. Schön (2017) emphasize that teaching methods of the part-time instructors who have an experience in the private sector and full- time academic staff expose differences in presenting knowledge and experience. This diversity in teaching methods

supports design students in different aspects and helps them to overcome the uncertainties they experience during the project development process. As the learning styles of each student can be different from each other, the use of visual, auditory, and physical learning techniques creates significant differences in educational processes (Kolb, 1984; Demirbaş & Demirkan, 2007). Especially in the design process, experiential approaches improve the design process by strengthening students' empathy skills in the context of user-product relationships. Both the experience transfers of the design instructors and the learning processes of the students by experiment support the learning methods through experience (Dewey, 1938).

Although the goal of the product design studio in design education is a final product output, the education is based on the design process management. An experience-oriented approach is followed throughout the process. This approach allows design studio instructors to transfer their work to students. Thus, it enables the student to understand the user experience and design new experiences by experiencing the design process (Kolb, 1984). For the instructors develop different perspectives in whether private sector or academic life, their approach to product design and development processes and their priorities in approaching students' projects may differ (Glaskin-Clay, 2007). While performing their profession, the industrial designers primarily aim to meet the user through mass production of the product. In academic design studies, in-depth research is carried out on the process of designing the product concurrently with the product itself (Reinikaine & Björklund, 2008). While the evaluation of the design project in the private sector is result-oriented, it progresses with a process-oriented approach in design education (Shavelson, Phillips, Towne & Feuer, 2003; Salama, 2005; Parkash & Kaushik, 2011). The focus in sectoral experience is concrete and technic oriented, the focus in academic studies it is abstract and process oriented. While in educational studies, how the result is obtained is questioned, in the industry, it is interested how much profit will be obtained from the

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result due to competitive strategies (Carson, Gilmore & Maclaran, 1998; Url1; Url2). However, both full-time and part-time design instructors, even if they have different specializations, have a common approach to the user and product focus of design projects. Because user-oriented product design is a common design requirement in both design education and private sector studies (Norman, 2013, p.9).

3. Transferring Experience and Design Education Methods

Changing design approaches depending on the experience and knowledge of the instructors in the education process can also affect the education methods (Schön, 2017). These methods and evaluations are carried out with periodic critiques, pre-juries, and final juries in industrial design education. All of the evaluations are aimed at increasing the knowledge of the students and improving their perspectives (Kolko, 2005). The transfer of experiences and knowledge by the instructors with different teaching methods reveals a versatile experience transfer process.

In the last 100 years, it is seen that transferring experience and knowledge from design instructors to the student has taken place in different networks. The master-apprentice relationship in the craft tradition continued during the Bauhaus. In this context, the students, who studied with instructors and with art and design masters as well, were involved in an atelier oriented industrial design education (Lerner, 2005). The diversity in learning and methods brought by instructors with different experiences enabled students to be equipped in a versatile way. Similar studies have been conducted to implement the approach in Turkey. The industrial design education began primarily as an elective course in the faculty of architecture at METU in 1969 (Er et al., 2003). After that, industrial design department was established and industrial design education had its own design curriculum (Karaer, 2011, p.17). Industrial design education has required the guidance of full-time and part-time instructors with different expertise such as art, technology and production. The difference in the educational techniques and methods of each field has caused a change in the theoretical and practical application weight of the course contents (Buchanan, 2004). Design education, which is developed with contemporary design and education methods, is carried out both in the master-apprentice relationship and in the teacher-student relation, especially in the processes that are carried out one-to-one with the student in design studio. The atelier tradition, which comes from the historical roots of design education, supports the experience-oriented learning style in design studios (Buchanan, 2004). The design processes carried out by the experience transfer method enable the synthesis and use of academic and practice oriented sectoral knowledge. The production, materials, finance, and result-oriented approach of the design practice, combined with the research, analysis, development, and process-oriented approach of academic education, enables students to learn new experiences before they even experience professional life (Leutenecker-Twelsiek, Ferchow, Klahn & Meboldt, 2018). As a result, design students are prepared to business life. According to Peters (2012), a designer should be prepared in a specific design discipline or craft, with broad knowledge in design and with deep knowledge depending on individual orientation and expertise.

In addition to the approaches of full-time and part-time instructors in the design studio, the principles and methods of teaching are applied in the context of industrial design education, as in all educational processes. Teaching methods such as lecture, discussion, case study, demonstration, problem-solving and individual work are used in the critics and presentation studies given to students in product design projects (Köksal & Atalay, 2017). These methods diversify in the industrial design studio operation and enable studio instructors to manage the process with different edits. As an example, the role-playing technique is presented as a method that supports creativity and empathy in the course learning process (Köksal & Atalay, 2017). Thus, design students can understand what was taught, what they hear

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and see by being included in the processes (Peters, 2012).

4. Research on Transfer of Experience in Industrial Design Studio Education

The techniques and methods used by the studio instructors can significantly affect the performance of the product design project by the students. Besides the development of the methods, the instructor's openness to self-improvement reflects on the development of the students (Micari & Calkins, 2021). Instructors' teaching with effective methods ensures that students have permanent knowledge and experience in both undergraduate education and professional life. In line with these values, it is envisaged that a concrete experience will be transformed into abstract concepts with the reflective method in product design studios where teaching is carried out with the transfer of experience (Kolb, 1984). In design education, the different approaches of the instructors, the way of transferring the experiences, and the pedagogical aspect of the communication with the students are seen as processes that should be evaluated for the teaching stages (Boucharenc, 2006). At this point, determining the different methods preferred by full-time and part-time instructors and measuring their cause of selection is important for design education.

4.1. Research Method – Survey

This study aimed to investigate the ways of transferring knowledge and experience in reference to the experiences of full-time and part-time industrial design studio instructors and the teaching methods they use. Different approaches of the instructors' depending on their design and production sector experiences on the design project development processes was also investigated. In this direction, a survey was prepared in which the experience transfers and teaching methods of design instructors were questioned. In Turkey, industrial design education starts with basic design studio education in the first year. Therefore, within the scope of the research, the sample was limited to the second, third and fourth grade industrial design studio instructors. For the transfer of experience to be based primarily on industrial

design values, all participants are selected among industrial design graduates. A survey prepared in Google Forms was sent to the participants meeting the criteria of having bachelor's degree in industrial design via their institutional e-mail addresses and their LinkedIn addresses. The name of the institutions where the participants' works were not included in the survey in order to construct a general approach about the subject matter. However, the status of being a full-time instructor or a designer working in the private sector and participating in a design studio in the academia is primarily questioned as to the fundamental purpose of the research. The methods and approaches used by the participants in design education are also grouped as variables that change depending on this basic purpose. The survey consisting of 12 questions for design studio instructors was divided into three sections: experience (classification of instructors), experience transfer process (method of conveying information) and evaluating results of design process.

The first section of the survey consists of multiple-choice questions prepared for the classification of instructors who contribute to the industrial design studio. The participants could tick more than one option. The questions covered the following issues:
1.   The areas in which the design studio instructor has professional work experience,
2.   The status (full-time or part-time) in the university where the instructor participates in the design studio,
3.   The design studio courses the instructor participated in the last two years.

A limitation for the last two years has been imposed, considering the variation by years in the undergraduate levels and to control if the instructors participated in a basic design course or not. Right at the beginning, basic design course was excluded from the study.

The second section consists of questions about how and by which sources the instructors convey knowledge and experience to the

students in product design studios. The questions intended to get;

4. Which period of his/her professional experience the instructor mentions most during studio critiques

5. Which methods were used during communication in design critiques,

6. The way of expression in the design critique session,

7. The situations questioned in the student projects,

8. The way of conveying the mistakes that need to be fixed to design students

Except for the seventh question, the answers were prepared as multiple choices for marking just one option. In the seventh question, participants were able to mark all of the five options, as the question aimed to investigate the most common methods for evaluation approach of participants. The same question has an ''other'' option for adding different opinions.

In the third and last section, it was aimed to evaluate the design project process flow by participants. Questions of the last part aimed to understand:

9. If the instructor evaluated the projects by conducting process or result-oriented approaches,

10. The aspects that the instructor pays attention to in the jury presentations,

11. The type of the communication established with the student during the process,

12. How to eliminate the shortcomings identified in the design studio education as a result of the evaluation?

All four questions were multiple choice for marking just one option. Eleventh question has an ''other'' option for indicating different opinions.

In line with the questions listed above, the hypotheses that constitute the research questions of the study were obtained. Hypotheses of this study were created with different combinations of the eight questions from survey. For example, first question and second question constituted the hypothesis ''a'' in the hypothesis table (Figure 1).

The survey answers were analysed with the Chi-Square Test of Independence using the SPSS

program. Analyses are designed to answer the following research questions as follows.

a. Do instructors' status at universities vary depending on their experience? This hypothesis is constituted from first question and second question.

How the experiences of the product design studio instructors affect the way they work at the university has been examined through their experiences in the private sector. This hypothesis serves to construct a relation between experience and academic status. The aim is to investigate the low rate of manufacturing experience can have a large impact on instructor status.

b. Do the examples given by the instructors during studio education vary depending on their experience? This hypothesis is constituted from first question and fourth question.

Instructors profit by their experience to teach product design properly during knowledge transfer process in design studio. Given examples can differentiation such as experiences of instructors. The differences between the examples given by the instructors having design experience in private sector and the instructors without experience aimed to be investigated.

c. Do instructors' teaching methods change depending on their experience? This hypothesis is constituted from first question and fifth question.

Instructors learn different design methods and teaching methods during their different experiences. Experiences of the product design studio instructors can affect the way their teaching methods during studio projects has been examined. The aim is to investigate the differences between the teaching methods of full-time instructors and private sector experienced part-time instructors.

d. Are the instructors' methods of communicating with the students' mistakes related to part-time or full-time status? This hypothesis is constituted from second question and eighth question. Full-time instructors have
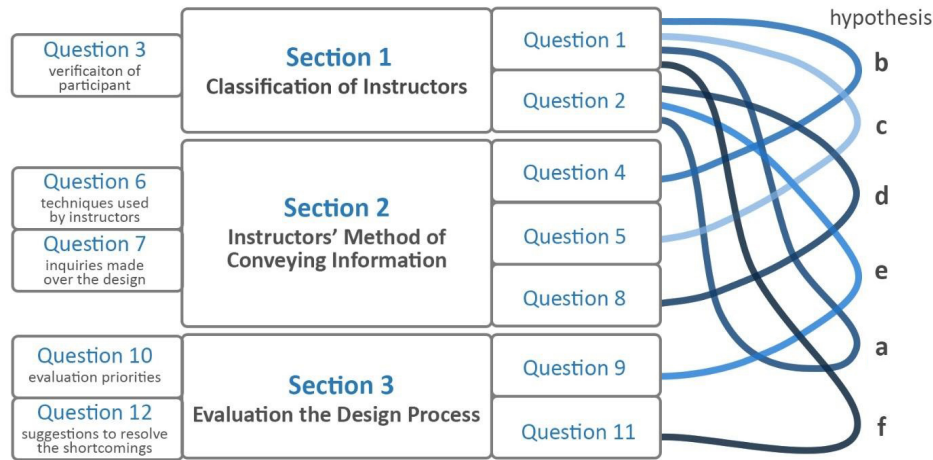
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Figure 1: Creation of research hypotheses

the opportunity to communicate with students at any time during education in university. However, the main duties of part-time instructors are in the private sector, so their contact with the students is limited. In such a situation, how the approach of these two types of instructors differ to the student's mistakes is aimed to be investigated.

e.   Is the focus of the instructors during design projects related to their academic status? This hypothesis is constituted from second question and ninth question.
Instructors, actively participating in design practice, must pay attention to results of the production at the same time with design studio lectures. In design studio, exactly there isn't production phase unlike designing phases. The aim is to investigate how the instructors' status affect an evaluation of the studio project.

f.   Does the experience of the instructors as a product designer affect his/her communication style with the design student? This hypothesis is constituted from first question and eleventh question. The communication styles between the instructor and the design students were handled in three types as: regular teacher-student relationship, master-apprentice relationship and managing the design process collaboratively. Within the framework of these three types of interaction, the effect of instructors' product design experience was tried to be examined.

As an addition, participants' responses to sixth, seventh, tenth and twelve questions were collected in order to analyse common approaches in phases of design projects four parts as (Figure 1):
●   Techniques used by the instructors in studio critiques,
●   Inquiries made over the design during the critiques,
●   Evaluation criteria in design project juries,
●   Suggestions to resolve deficiencies in studio projects

5. Analysis and Findings
33 industrial design instructors from 12 different universities participated in the survey. Participants from five state universities, and seven private universities took part in the study. 24 full-time academic participants had product design experience in private sector previously. 24 participants work as full-time instructors, seven participants are part-time, and two participants have conducted product design project education as jury/project guest members. Part-time affiliations and jury memberships of the full-time academic participants were not considered in the study. For this reason, the coding for the responses of these instructors has been processed as full-time. Similarly, participants who were both part-time instructors and jury/project guest members also were accepted in the analysis primarily with their part-time assignments. It

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was observed in the participant groups that every instructor who has manufacturing experience on the line of products in private sector also has design experience. Since answers of the participants show that every designer does not work on manufacturing of design products. In this situation manufacturing experience accepted as a separator qualification for analyses. Although there is no comprehensive coding due to the diversity of experience, having design experience in changes due to academic and private sector experience was considered inclusive for the private sector experience. So these experiences were described as with design experience and non-design experience.

The 33 responses to the questionnaire provide the minimum number needed to employ the quantitative method in this study (Eymen, 2007; Akdağ, 2011; Şen, 2019) Since this study is a pre-evaluation for 6 research questions examiden, 33 design instructors were approached with equal probability and Simple Random Sample method was found suitable for this study (Kılıç, 2003). The hypotheses were analyzed with the Chi-Square Independence test in the SPSS program due to non-parametric data of the questionnaire (Eymen, 2007). The research questions were examined in six graphics in line with the Chi-Square

Independence tests made in the SPSS program. If the p value of a hypothesis, which is the result of the analysis, is less than 0.05, the hypothesis is provided, and if the p value is greater than 0.05, the hypothesis is not provided (Eymen, 2007). The "p" significance relevance in the four hypotheses from the research questions were found to be less than 0.05 in the analysis. Thus, it was seen that the activities of the sample group changed significantly in these analyses and that they occurred with the majority of the participants in other two analyses. In these graphics, gradients from dark to light show sequential direction of answers from up to end, there is not related with majority of answers.

a.Do Instructors' Status at Universities Vary Depending on Their Experience?
With the first and second questions in the survey, the distribution of instructors' private sector experiences in the answers was actualized. It was observed that the participants who worked full-time in the institutions where they carried out the design studio training did not have a significant level of manufacturing experience compared to the other participants. It was determined that the rate of manufacturing experience was higher in the participant group consisting of part-time instructors (Figure 2).

	Full-Time	Part-Time	Jury / Project Guest
■ With Manufacturing Experience	5	5	1
■ Non-Manufacturing Experience	19	2	1

It has been determined that there is a significant relation between the way educators work and manufacturing experience. X^2 (2, N = 33) =6.509, p = 0.039.
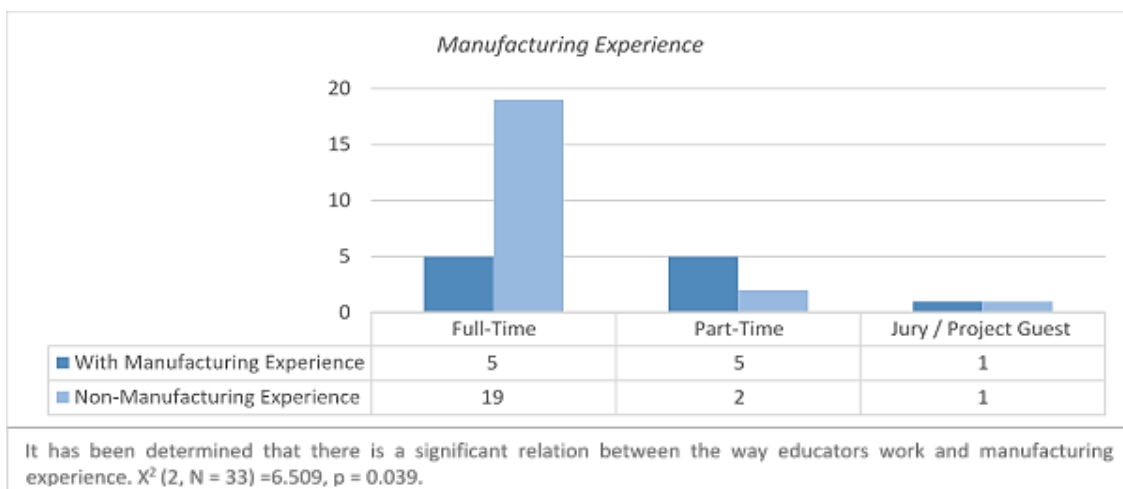
Figure 2: *Relationship between manufacturing experience and working condition*

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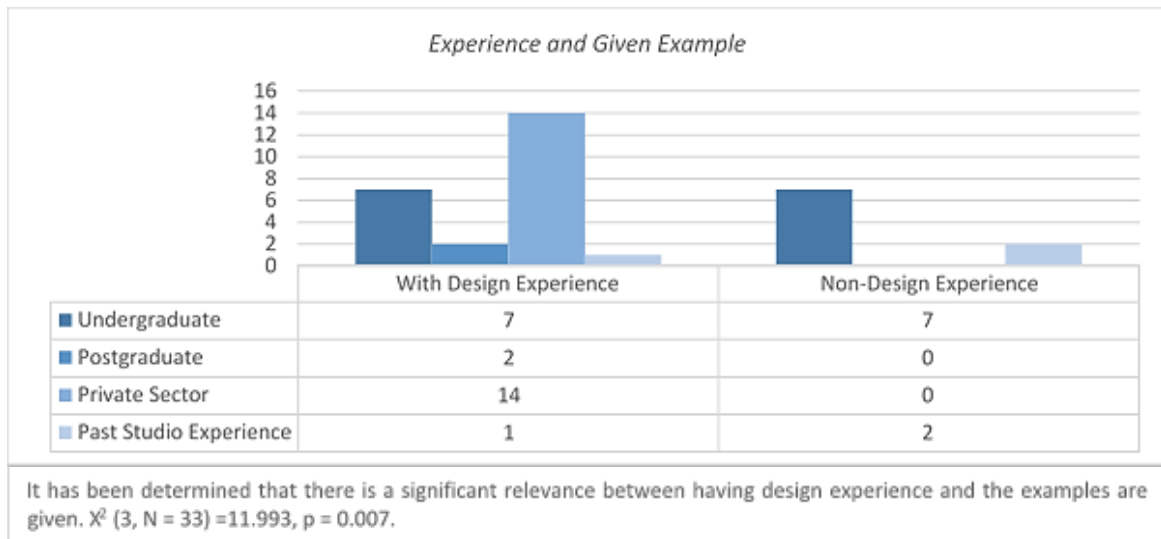
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Figure 3: The relation between design experience and giving examples.

b. Do the Examples Given by the Instructors in the Design Education Process Vary Depending on Their Experience?

With the first and fourth questions in survey, it has been observed that the examples given in the product design studio vary depending on the experience of the design instructors. While the highest rate of participants with design experience is in the private sector, participants without design experience cannot give examples from the private sector (Figure 3).

c. Do Instructors' Teaching Methods Change Depending on Their Experience?

According to the answers of the first and fifth questions, it was seen that instructors with design experience approached the process by using the method of asking questions prominently. Although there was no significant change, it was observed that the instructors who did not have design experience first made comments on the design. It was stated by the participants that no comparison was made by giving examples of existing products in the market (Figure 4).
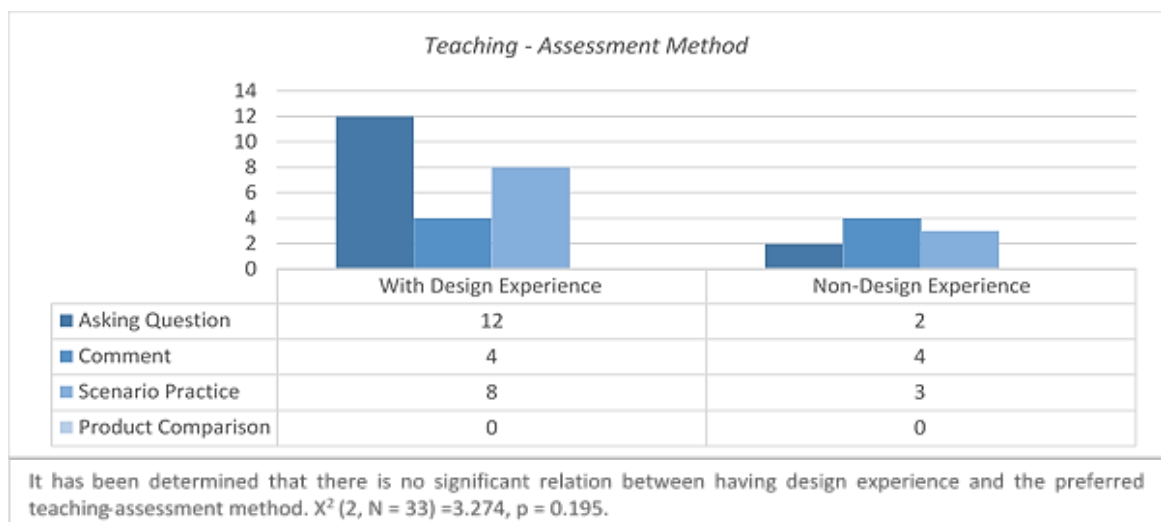

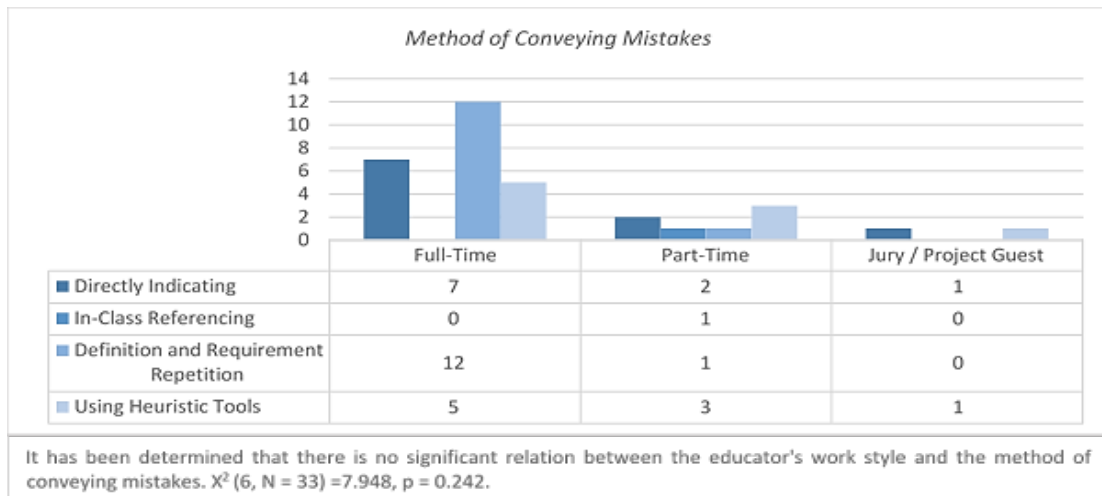*Figure 4: The relationship between design experience and assessment method*

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Figure 5: *The relationship between working style and mistake resolution*

d. *Are the Instructor's Methods of Conveying Students of Mistakes Related to the Way They Work at the University?*

Although there is no direct relationship between instructor status and conveying of mistakes, it has been observed that full-time lecturers try to eliminate mistakes by repeating the related descriptions more. According to answers of eighth question, it was determined that the direct indication of the mistake was repeated more frequently than the intuitive understanding of the student. Part-time lecturers, on the other hand, come to the fore when they try to correct student mistakes in intuitive ways (Figure 5).

e. *Is the Focus of the Instructors During Design Projects Related to Their Academic Status?*

In the ninth question, the participants were asked to indicate their focus on design process considering the transition from process to result in five stages as indicated in Figure 7. With answers of second question it was seen that while full-time lecturers followed a process-oriented approach, part-time lecturers were observed to contact the design projects with a result-oriented approach (Figure 6).
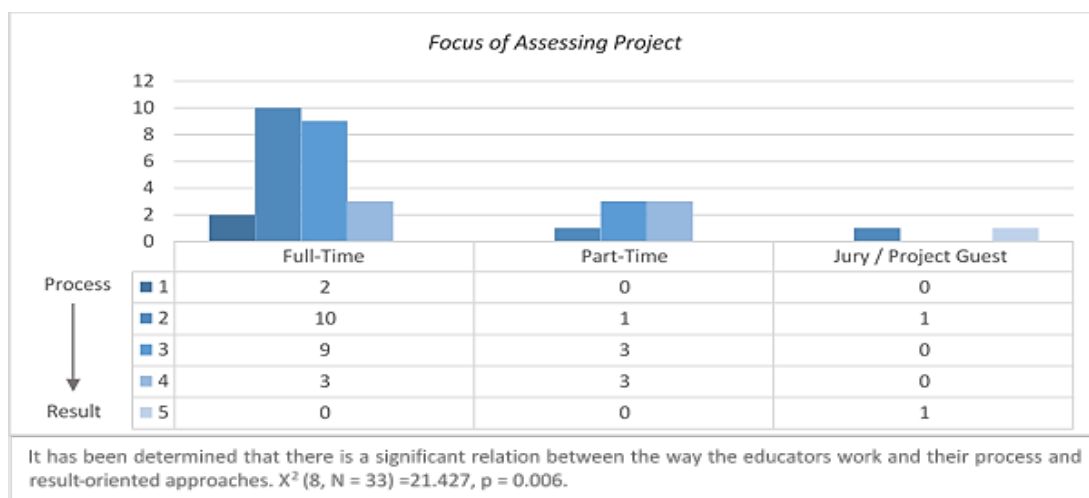

Figure 6: *Relation between working style and project focus*

f. Does Having Product Design Experience Affect the Way of Communication Between Instructors and Design Students?

In the 11th question, regular teacher-student relation, master-apprentice relation and collaborative communication of instructor-student relation were examined. With participants' product design experience answers of the first question; although the collaborative learning method is prominent in all of the participants, it has been determined that all of the instructors who do not have product design experience, at a significant level communicate with the student with the collaborative learning method. It has been observed that experienced instructors communicate with standard teacher-student, master- apprentice and role-playing method. As another communication types, participants prefer to use role- playing technique and more experienced friend relationship in communication with students (Figure 7).
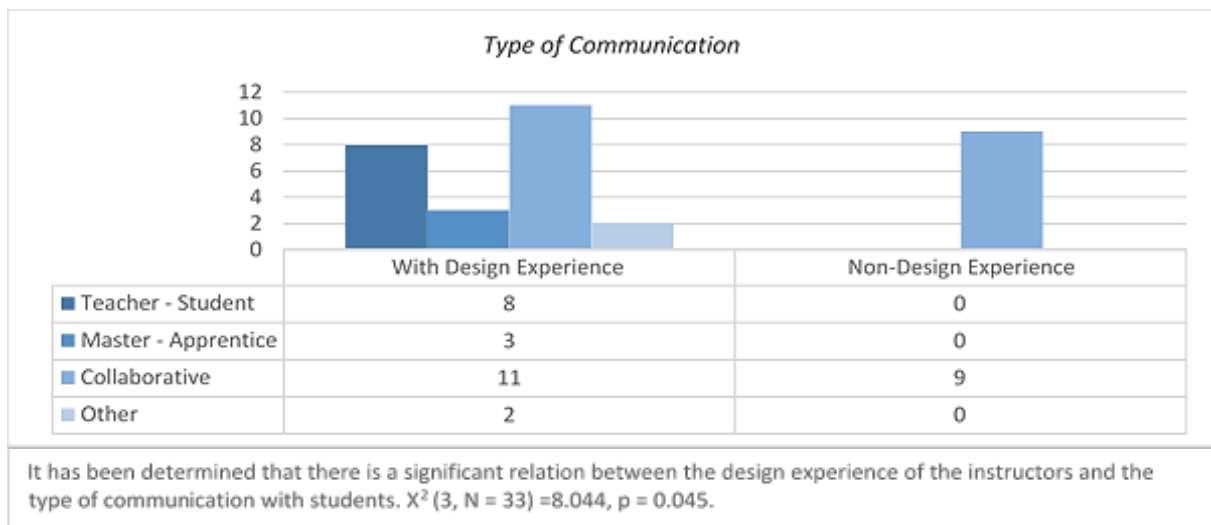

	With Design Experience	Non-Design Experience
■ Teacher - Student	8	0
■ Master - Apprentice	3	0
■ Collaborative	11	9
■ Other	2	0

It has been determined that there is a significant relation between the design experience of the instructors and the type of communication with students. X^2 (3, N = 33) =8.044, p = 0.045.

Figure 7: The relation between design experience and the type of communication with the student

Table 1: Options about design techniques, evaluation and shortcomings

	Techniques Used by Instructors (question 6)	**Inquiries Made Over the Design** (question 7)	**Evaluation Priorities** (question 10)	**Suggestions to resolve Deficiencies** (question 12)
Options for Questions	Verbal lecture Taking notes on the sheet Sample sketching Expression with physical acting	Problem and solution suggestions Visualization methods Difference from existing products Cause of purchased by user Affordance Scenario - user - environment Production method Section and detail drawings Model making Material selection Geometrical relationship Form - function relationship Practicing previous critiques	Concept development Solving problem and design proposal Perspective drawings User and Product Scenario Technical drawings Material and production techniques suggestions Quality of model making	Academy focused Private sector focused Academy and private sector

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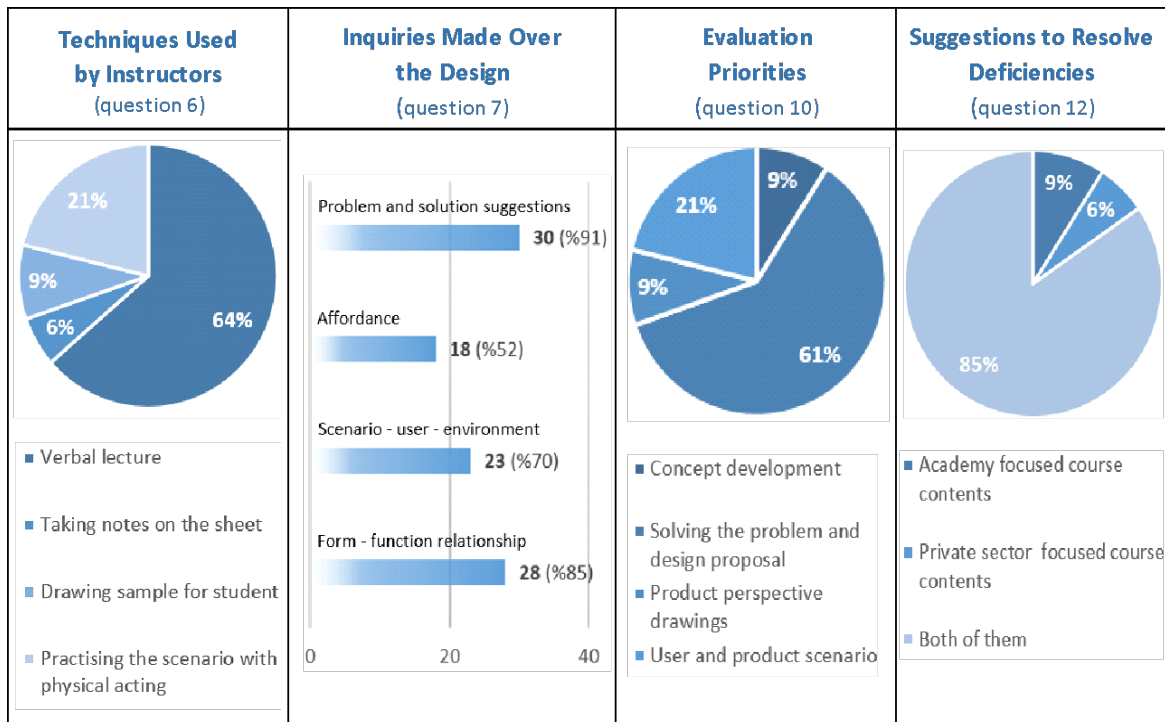
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Figure 8: Highlights from answers of four questions

In addition to the Chi-Square Test of Independence for survey responses, four questions were analysed as a discussion about design education. Table 1 was created with the options prepared. In these evaluations answers of full-time and part-time instructors were analysed together and majority of answers were showed with graphs in Figure 8. Gradients from dark to light show sequential direction of answers from up to end, there is not related with majority of answers.

•Techniques Used by Instructors in Their Design Critique Process
According to the answers to the sixth question, it was observed that the methods of guiding the student during the design critiques did not change according to the experience or the type of affiliation (part- time or full-time), 64% of the participant instructors gave the students critique by verbal expression. 21% of the participant use physical acting on scenario expression, 9% of the participants drawing sample sketches and 6% of the participants taking notes on the student's sheet during design critiques.

•Inquiries Made Over the Design in the Critique Process
In order to find out the issues to be considered during studio critiques, the participants were set free to choose more than one option in the seventh question. Accordingly, it was determined that 91% of the design instructors examine how the problem and solution suggestions were associated with each other in student's design. 85% of the participants indicated that they examine the form-function relationship in design projects. It was observed that 70% of participants consider user-time-environment relationships in the scenario. In addition, 52% of participants question the affordance of the product.

•Evaluation Priorities in Design Project Juries
Tenth question suggested the consecutive design steps from concept design, systematic design, detailed design, test to prototyping as the evaluation criteria for jury presentations. It was seen that 61% of the participants evaluated the projects considering design problems and proposal studies. In the presentations where the user-product relationship of the participants

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was examined at a rate of 21%. It was determined that the full-time instructors had priority in evaluations on concept design and perspective drawings, unlike other participants. There 9% rates are both concept development criteria and perspective drawings.

•Suggestions to Resolve the Shortcomings Seen in the Product Design Process
According to answers to the last question of the survey, 85% of the participants' state that the shortcomings they encounter in product design studios should be overcome by both theoretical – academic courses and practical – sectoral courses. Considering the ratio of the two suggestions within themselves, it was stated that they could be supported more with theoretical academic research and analysis-oriented course contents.

6. Conclusion

The design processes carried out by full-time and part-time instructors with different experiences in industrial design studios vary depending on their knowledge and expertise. As there are different learning methods for students, the change in teaching methods also changes the communication dimension between the instructor and the student. Industrial design education, which develops from the atelier practice system, also includes experiential learning methods in the studio system. Master-apprentice or teacher-student relationship established depending on the system applied ensures that design education is an effective preliminary preparation for professional life. The changing rhythms of product design processes in the private sector are experienced in industrial design education in a fictional method, and it is aimed for students to benefit from previous experiences.

In this study where the transfer of experience in the product design process was analysed, the experiences and teaching methods of full-time and part-time design instructors were evaluated. The level of significance obtained in the data analysed in the research hypothesis 'b' showed that the experiences of the design instructors were effective on the examples they gave to the students in the design critique process.

Examples that are the result of private-sector acquisitions such as user empathy in the design process, production and material proposals, financial evaluations are given as preliminary information in professional life for students. With these examples, according to hypothesis 'c', it is seen that design experienced instructors approach student designs with the technique of asking questions. The questions asked for a clear and understandable design process direct the students to re-evaluation and help them find their own solutions. Also, it is seen that the design proposal offered by the student is not directly compared with the existing products in the market, and the critique process is advanced by interpreting it in a scenario.

The result of the hypothesis 'd' showed that mistakes in students' approach to design and the design process are tried to be removed by repeatedly transferring the definitions of product design and design requirements by full-time lecturers during the critique process. However, a pedagogically intuitive approach is required by following the learning styles of the student, with auditory, visual or physical expressions. In the output of the same question, part-time instructors are observed to guide students to produce their own solutions in the process by directly indicating the mistake. It is understood that the reason for the guidance in the design process may be the areas focused on design projects. The answers of the second and ninth question in the survey show that while full-time instructors have a process-oriented approach to the product design projects in the studio, part-time instructors' approach is more result-oriented. In this direction, it can be said that while full-time design instructors make regulations and inquiries about students' execution of the process, part-time instructors evaluate the attributes that characterize the product output.

According to the results of hypothesis 'a', the high rate of manufacturing experience among part-time lecturers has emerged as the source of result-oriented assessment. The experience gained from production and material-oriented studies is also conveyed through comments that exemplify these processes. It is seen that a

design proposal that is close to the final product is wanted to be evaluated as the output of the comments and critiques made. In this context, it is expected that there will be a different communication between the experiences of the instructors and the students. With the 11th question, it has been observed that instructors with product design experience can maintain the same relationship

with students depending on the relationships they have experienced in the private sector. It can be said that the experience of design instructors, who continue to transfer design experience in the master- apprentice relationship, is effective in the production focus. It is prominent that regular teacher-student communication is preserved. However, the interaction is mostly in the form of collaborative learning between instructors and students. It has been observed that design instructors with private sector experience use various communication methods with students, while instructors who do not have design or manufacturing experience continue their design education with only collaborative communication with students.

In the answers to question six, the use of verbal expression in a critique process as a communication method has emerged as a situation in contradiction with the provision of visual-based education in product design studios. In design studios where teaching methods by drawing or presenting are in the background, these methods should be introduced to the process. It is seen that the instructors take the role of the user with physical movements and can operate the process in the product-user relationship stages where the role-playing technique is frequently used. The answers of the seventh question showed that these methods of teaching in the design process are primarily applied to correctly evaluate the relationship between problem and solution suggestions and form-function relationship by the student. Regarding the physical role-playing technique, design instructors expect the product to be constructed within a scenario in the context of the user, time and environment. In this scenario, what the

product will perform, namely its affordance is questioned. According to eighth question, there are similar evaluation criteria in product design juries as in critiques. The relationship of the design problem with the product output is seen as the basic learning area of product design education. Since the concept development process, in which design idea production and student-specific design approach are transferred, is also at the first steps of the design process, this attitude of full-time and part-time instructors is supported by a process-oriented approach in itself. The correct use of drawing techniques is seen as a necessity of product design is an important factor in understanding how solution proposals are reflected in the product. Although the visualization studies of the product are at the first stages in the evaluation criteria, the lack of communication with the students by drawing in the project critiques creates a contradiction.

6.1. Discussion and Suggestions
The process-oriented approach of industrial product design education shows that the student specific idea and thinking structure is valued within the design process. These values should also be reflected in teaching methods and new techniques should be applied with a pedagogical approach. The skills of the design students should be suited for modern times. To train designers with up-to-date design methods, a modern design education curriculum developed with social sciences and technology should be applied (Meyer & Norman, 2020). In addition to the outputs discussed above, this study shows, understanding the needs of students with an intuitive approach required by the field of education and solving the mistakes made in a way that the student can best understand is a method that design studio instructors should also apply. Although full-time instructors are close to this approach, part-time instructors, in particular, should strive to communicate more with students. The working conditions of the instructors should positively affect their closeness and contribution to the field of education and students. The differences in full-time and part-time instructors and therefore in the working areas ensure the diversification of the focal points within the

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design studio. This diversity presents the points that design students should pay attention to both in the design process and the product outputs more clearly. It would be beneficial to ensure that instructors with different experiences and focuses in the design studios come together and that more instructors and designers from outside of the university should be invited to the design studios as guests.

According to outputs of the study, collaborative learning is not only among students; knowledge and experience sharing is also realized between instructors and students. While these collaborative works increase the processes that empathize with the student, it also enables the students to get closer to the experience of full-time and part-time instructors. Now, the regular teacher-student communication level should be exceeded in industrial design studios, and collaboratively focused on the production of shared values. Collaborative knowledge-creating processes that support the theoretical and practical infrastructure of product design education should continue to be implemented collaboratively by the design instructor and students by developing methods of editing to the scenario and changing roles related to the user.

Full-time and part-time instructors should set an example for students with the work they prioritize in design critique processes and jury evaluations. The visual outputs expected from the design process should be supported visually by the instructors. Because with the development of visual perception of students who continue industrial design education, their learning skills by drawing and watching increase. It is very important to bring these methods into the process in design studios where teaching methods by drawing or show remain in the background. To strengthen the student's empathy ability, the instructors must be able to empathize with the student correctly and apply the role-playing technique in user scenarios. In experiential design studios focused on learning by seeing and doing, instructors' presentations such as sample drawings, models, products and processes will increase the motivation of the students. Thus,

students will be able to construct their design processes more consciously to achieve the 'good design'.

The development of different forms of understanding, such as the visual perception of design students, throughout design education includes related issues that need to be studied. The change in the communication methods of the instructors with the students at different stages of the design process and the ways of understanding/perceiving the design instructors' directions constitute research questions for future studies. Along with the learning outcomes of students in design education, as in other literature studies, the teaching techniques and approaches of part-time and full-time instructors to the design process can be re-evaluated from the student's perspective (Kirker, 1990; Bolge, 1995; Burgess & Samuels, 1999; Rossol-Allison & Alleman Beyers 2011). At this point, unlike the existing literature, it is possible for design students to evaluate their educational processes with their verbal, visual and physical outputs after knowledge transfer. The study conducted in Turkey is planned to be improved by increasing the number of participants and stated research questions. Thus, the study is expected to be a resource for the development of student-oriented, process-oriented, and experience-oriented teaching methods in design education.

References:
Akdağ, M. (2011). SPSS'de İstatistiksel Analizler (Statistical Analysis in SPSS), Retrieved from https://www.coursehero.com/file/39904729/spss-testleridoc/ .

Bolge, R. D. (1995). Examination of Student Learning as a Function of Instructor Status (Full-Time versus Part-Time) at Mercer County Community College. Retrieved from https://eric.ed.gov/?id=ED382241 .

Boucharenc, C.G. (2006). Research on Basic Design Education: An International Survey. *International Journal of Technology and Design Education*, 16, 1-30, DOI: 10.1007/s10798-005-2110-8.

Journal of Design Studio, v:4 n:1
Bodur, G., Akbulut, D., (2022), Transferring Experience in Industrial Design Studio Education

77

Buchanan, R. (2004). Human-Centered Design: Changing Perspectives on Design Education in the East and West. *Design Issues*, 20(1), 30-39.

Burgess, L. A., & Samuels, C. (1999). Impact of full-time versus part-time instructor status on college student retention and academic performance in sequential courses. *Community College Journal of Research & Practice*, 23(5), 487-498.

Carson, D., Gilmore, A., & Maclaran, P. (1998). Customer or Profit Focus: An Alternative Perspective. *Journal of Marketing Practice: Applied Marketing Science*, 4(1), 26-39.

Demirbaş, O. & Demirkan H. (2007). Learning Styles of Design Students and the Relationship of Academic Performance and Gender in Design Education. *Learning and Instruction*, 17, 345-359.

Dewey, J. (1938) *Experience and Education*. 1st ed. Simon & Schuster, New York.

Er, A., Korkut, F., & Er, O. (2003). U.S. Involvement in the development of Design in the Periphery: The Case History of Industrial Design Education in Turkey, 1950s-1970s. *Design Issues*, 19(2), 17-34.

Eren, G. H., Korkut, F., & Burgazlı, L. (2017). Tasarım Eğitimi Projelerinde Tasarım Araştırmasının Fikir Geliştirmeyle Bütünleştirilmesinde Eğitimcilerle Öğrenciler Arasındaki İşbirliği (Collaboration Between Educators and Students in Integrating Design Research with Idea Generation in Design Education Projects), *Middle East Technical University UTAK 2016 İkinci Ulusal Tasarım Araştırmaları Konferansı: Sorumluluk, Bağlam, Deneyim ve Tasarım Bildiri Kitabı*, 541-556.

Eymen. E. (2007). SPSS 15.0 Veri Analiz Yöntemleri (SPSS 15.0 Data Analysis Methods). Retrieved from https://yunus.hacettepe.edu.tr › courses › bby606.

Glaskin-Clay, B. (2007). Part-Time Instructors: Closing the Quality Loop. *College Quarterly*, 10(3), 1- 11.

Karaer, F. (2011). A Research on Turkish Industrial Design Literature: The Analysis of the Academic Studies Between 1971–2009. Master's Thesis. 17. İstanbul Technical University. İstanbul.

Kılıç, S. (2013). Örnekleme Yöntemleri (Sampling Methods). *Journal of Mood Disorders*, 3(1).

Kirker, M. J. (1990). Variance in student ratings of part-time and full-time instructor effectiveness by teaching field and function at a midwestern community college. Doctoral dissertation, Iowa State University.

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development*, Prentice-Hall.

Kolko, J. (2005). New techniques in industrial design education. In Design-System-Evolution, *Proceedings of the 6th International Conference of the European Academy of Design*, EAD06.

Köksal, O., & Atalay, B. (2017). Öğretim ilke ve yöntemleri (Çeşitli uygulamalarla yöntem ve teknikler) [Teaching principles and methods (Methods and techniques with various applications)]. Konya: Eğitim Yayınevi.

Laal, M., & Laal, M. (2012). Collaborative learning: what is it? *Procedia-Social and Behavioral Sciences*, 31, 491-495.

Lai, Y. C., & Peng, L. H. (2019). Effective teaching and activities of excellent teachers for the sustainable development of higher design education. *Sustainability*, 12(1), 28.

Landrum, R. E. (2009). Are there instructional differences between full-time and part-time faculty? *College Teaching*, 57(1), 23-26.

Lerner, F. (2005). Foundations for Design Education: Continuing the Bauhaus Vorkurs

Journal of Design Studio, v:4 n:1
Bodur, G., Akbulut, D., (2022), Transferring Experience in Industrial Design Studio Education

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Vision. *Studies in Art Education*, 46(3), 211-226.

Leutenecker-Twelsiek, B., Ferchow, J., Klahn, C. & Meboldt, M. (2018). The Experience Transfer Model for New Technologies—Application on Design for Additive Manufacturing. Industrializing Additive Manufacturing - *Proceedings of Additive Manufacturing in Products and Applications - AMPA2017*, 337-346.

Levy, R. (1990). Design Education: Time to Reflect. Design Issues: *Educating the Designer*, 7(1), 42- 52.

Liyanage, C., Elhag, T., Ballal, T., & Li, Q. (2009). Knowledge communication and translation a knowledge transfer model. *Journal of Knowledge Management*, 13(3), 118-131.

Manzini, E. (2009). New Design Knowledge. *Design Studies*, 30, 4-12.

McMahon, M., & Kiernan, L. (2011). Beyond the studio: collaboration and learning outside the formal design studio. *Design Principles and Practices: An International Journal*, 5(3), 449-461.

Meyer, M. W., & Norman, D. (2020). Changing design education for the 21st century. She Ji: *The Journal of Design, Economics, and Innovation*, 6(1), 13-49.

Micari, M., & Calkins, S. (2021). Is It OK To Ask? The Impact of Instructor Openness To Questions On Student Help-Seeking and Academic Outcomes. *Active Learning in Higher Education*, 22(2), 143- 157.

Norman, D. (2013). *The Design of Everyday Things*, Revised and Expanded Edition. 9. Basic Books. New York.

Parkash, S., & Kaushik, V. K. (2011). Simple, Cost Effective & Result Oriented Framework for Supplier Performance Measurement in Sports Goods Manufacturing Industry. *LogForum*, 7(3), 11-24.

Peters, J. (2012). Educating Designers to a T. *Design Management Review*, 23(4), 62-70.

Reinikaine, M. T. & Björklund, T. A. (2008) PD6 – An Idea Generation and Evaluation Method. *Proceedings of the SEFI 36th Conference on Quality Assessment, Employability and Innovation*, 1-6.

Rossol-Allison, P. M., & Alleman Beyers, N. J. (2011). The Role of Full-Time and Part-Time Faculty in Student Learning Outcomes. *Association for Institutional Research (NJ1). AIR 2011 Forum*, Toronto, Ontario, Canada.

Salama, A. M. (2005). A process oriented design pedagogy: KFUPM sophomore studio. *Centre for Education in the Built Environment Transactions*, 2(2), 16-31.

Schaar, R., & Shankwiler, K. (2008). Design Gateway: Pedagogical Discussion of a Second-Year Industrial Design Studio. Georgia Institute of Technology.

Schön, D. A. (2017). *The Reflective Practitioner: How Professionals Think in Action*. Routledge.

Shavelson, R. J., Phillips, D. C., Towne, L., & Feuer, M. J. (2003). On the science of education design studies. *Educational Researcher*, 32(1), 25-28.

Şen, S. (2019). SPSS ile Meta-Analiz Nasıl Yapılır? (How to Do Meta-Analysis with SPSS.). *Harran Maarif Dergisi*, 4(1), 21-49.

Ulrich, K. T. & Eppinger, S. D. (2012). *Product Design and Development*, 5th ed. 14. McGraw-Hill, Singapure.

URL-1: Equal Parts, The Difference Between A Task-based And Results-based Company (n.d.). Retrieved 04 May, 2022, from https://equalparts.co/blog/the-difference-between-a-task-based-and-   results-based-company/#:~:text=Results%2DOriented%20companies%20focus%20more,on%20producing%20a%2 0quality%20product.

Journal of Design Studio, v:4 n:1
Bodur, G., Akbulut, D., (2022), Transferring Experience in Industrial Design Studio Education

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URL-2: Industry Today, Result-Oriented vs Process-Oriented Approaches (2019) Retrieved 04 May, 2022, from https://industrytoday.com/awareness-about-result-oriented-vs-process-oriented-approaches/

Yang, M. Y., You, M., & Chen, F. C. (2005). Competencies and qualifications for industrial design jobs: implications for design practice, education, and student career guidance. *Design studies*, 26(2), 155-189.

Wong, Y. L., & Siu, K. W. M. (2012). A model of creative design process for fostering creativity of students in design education. *International Journal of Technology and Design Education*, 22(4), 437- 450.

Considering Sidewalls as an Architectural Ground: Parasitic Architecture Approaches in Design Studio

Atlihan Onat Karacali
Faculty of Fine Arts, Design and Architecture, Istanbul Topkapi University, Istanbul, Turkey (Corresponding author)
Tugba Erdil
Faculty of Architecture, Halic University, Istanbul, Turkey

Abstract: Approaches mimicking nature constitute a biopolitical specific area in architecture. Today, what is called parasitic architecture is also accepted as one of these biopolitical approaches. Parasitic architecture follows the path of parasitism in nature in terms of biomimicry. And parasitism is accepted as one of the symbiotic lifeforms, others being commensalism and mutualism. They all consist of the biological relationship between distinct organisms where parasitism specially defines duality between a harming parasite and a vulnerable host. Talking in architectural terms, here the parasitism defines an additional structure that can only exist via clinging to a preexisting one. These clinging mechanisms or reflexes can be listed as "sticking", "climbing", "holding", "fixing", etc.

This study aims to evaluate the architectural parasitism phenomena as a case study for the design studio. As known, the design studio is the backbone of architectural education, which is carried on with unique themes each semester. Hence, such a theme was programmed in İstanbul Topkapı University, Interior Architecture and Environmental Design department in the 2021-2022 Spring Semester, to handle the surrounding idle walls in an ad hoc way as hosting structures for parasitic design ideas of the students. As a result of the works, the idle walls were converted into fruitful public backgrounds for creating a large variety of design ideas with distinct functions and structures as well.

Keywords: Design studio, Parasitic design, Parasitism, Biomimicry, Adhocism

Introduction:
The term "place" has always been comprehended within grounded concepts that identify themselves with earthly notions. According to Deviren (2001), this is the very point it differs from the concept of "space" for space has the opportunity of being non-grounded or abstracted. However, approaches that examine the terms of space and place in certain dualities such as Contextualism, regionalism, or Genius Loci basis of Norberg-Schulz (Norberg-Schulz, 1980), the common

ground of these approaches show themselves in certain levels of comprehension as below.

- The notion of longing purposes that the space will remain in the same place forever.
- The notion of harmony of space and place on certain datums is based on the possibilities of built-environment.
- The notion of bureaucratic approach towards spatial design strategies on certain hierarchy.

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- Ownership discussions are based on the notion of belonging to certain locations.

However mentioned approaches had carried on their authorities, especially in early Modernist tendencies, non-physical spatial approaches create opposite grounds for alternative entities of space. These new points of view create a large-scale level on a phenomenological level from existential discussions to non-spatiality, mobility, and nomadism in architecture which either can define certain levels of comprehension or can be encountered in various combinations in contemporary architecture. Thus, we must admit that this permeability between these terms creates fruitful grounds for experiencing architecture in genuine discourses of nomadism.

Method:
The archi-bio-political method which firstly mentioned by Bertalanffy (1928). This approach takes a significant role in many interdisciplinary studies in Architecture by gaining an "archi-bio-political" vision (Şentürk, 2013). These studies suggest that biological systems can be a reference for multi-disciplinary research areas, General System Theory he put forward began to be used as the reference point for socio-cultural and even political surveys by researchers like Lauhmann (1989). Regarding this point of view, this paper takes its motivation from an archi-bio-political approach and aims to carry basic principles of parasitic notions of biology to the architectural discussion by its organization dynamics. Talking about the organizational system, parasitic approaches creates a level of comprehending design issues by creating design solutions for idle areas of the city. The

flexibility and adaptation ability of parasitic design also gains an Ad hoc notion rather than following bureaucratic steps towards design.

Discussion is based on pointing out the common sense of Ad hoc notions of parasitic architecture by literature research. While literature discussion creates the ground for Adhocratic design principles of parasitic architecture, an experimental design studio for Idle sidewalls located in Galata-İstanbul allows examining parasitic design approach towards giving new functions for non-sense surfaces of urban aesthetics.

Scope:
Possibilities based on location are the main discussion area of this paper which will be discussed under the topics of space notions in nomadism, parasitism, and adhocism.

Nomadism in Space Notion
While nomadism in architecture takes its motivation from being mobile, the etymology of the term "mobility" depends on moving. However modernist approaches show great interest in contexts depending on certain spaces, we encounter steps of getting free from the place in various examples during history. Firstly, the experiment of the Dymaxion Pavilion of Fuller suggests a mobile form of the house that consists of prefabricated elements achieved via air transportation in the early Industrial Revolution (Sönmez, 2004), (Figure 1). On the other hand, Archigram is one of the most known fantasies of breaking free from depending on certain spaces in the 1960s architectural world (Sönmez, 2004). Sometimes origin of this fantasy depends on the basic motivation of breaking free from a sense of
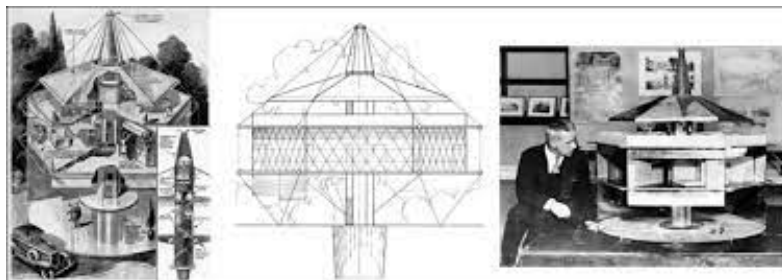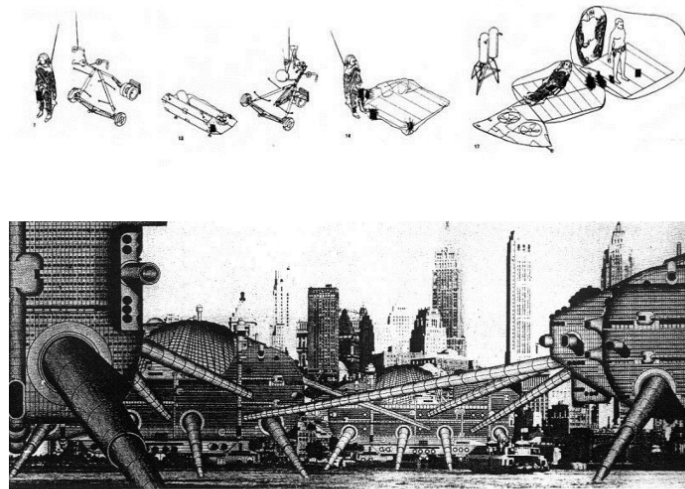

Figure 1: Dymaxion Pavilion of Fuller (Fırat, 2006)

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Figure 2: Nomadistic Life-Kit designed by Michael Webb and walking city Archigram designed by Ron Heroon (Fırat, 2006)

belonging which would help society to develop a sense of obvious happiness away from doctrinal discourses of architectural context depending on the place. Thus, Nomadistic Life-Kit designed by Michael Webb, and the walking city Archigram designed by Ron Heroon, give utopic experiences of a non-owned land by being mobile (Figure 2).

Both approaches build a stance against regionalist and contextualist examinations as well as the Genius-Loci discourse of Norberg-Schulz (1980). The main ground of this stance can be explored as a new type of manifestation which refuses the bureaucratic hierarchy of Modernism developed on certain rules to follow. Making the building free from space gives opportunities for eliminating regional codes from design issues and creates a free universe for the design itself (Zerzan, 2004).

Parasitism in Architectural Approaches
Kronenburg (1998) defines mobile architecture as a moving building. However, the term mobility developed by non-locational approaches based on movement, contemporary approaches in architecture shows various levels of mobility beyond being merely dependent on moving. As Fırat mentions that every structure which arises against rigid relation between building and place can be countered as mobile including any temporary from pneumatic structures (Figure 3) to prefabricated structures (Figure 4) (Fırat, 2006). This new point of view gives insight into mobile architecture and a sense of nomadism as well as using instant opportunities in design approaches towards space. Parasitic architecture relates to nomadism in the context of the "loss of space" idea of Norber-Schulz (1988), which offers the idea of alienating the place. When Deleuze (1968) also claims that alienating to place means alienating to reality itself, nomadistic approaches can easily comprehend as defining new codes away from the reality of the place as well as changing the position of movement.

Figure 3: Pneumatic parasitic structure clinging to air conditioning system of an existing structure (URL-1)

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Figure 4: *A living unit articulating billboards in Belgium (Yorgancıoğlu & Seyman Güray, 2018)*

Here the discussion of parasitism finds its proper place in the name of nomadism by creating new codes in certain places. Biologically, parasitism is one of the symbiotic life forms while symbiosis means "living together" as a host and guest (Yorgancıoğlu & Güray, 2018). Contemporary research on the bio-politics of architecture creates a new vision of carrying biological definitions on architectural comprehension. When Foucault (1986) defines a level of understanding which claims that everything related to living creatures became "bio-politic", Şentürk (2013) defines "archi-bio-politics" as an interdisciplinary approach based on building relationships between the concepts of living creatures and the meaning of biological effects on architectural reflections. Hence, talking about symbiotic definitions in biological forms can bring new readings in understanding humans, places, and architecture.

According to symbiotic relationships mutualism defines the relationship between the host and guest when both creatures benefit from the relationship while commensalism defines this relationship as one of the sides of the benefits of the relationship as the other is not affected at all What makes a structure parasitic is this condition is the fact the "guest" benefits from the other while the "host" is harmed. Hence, Myburg (2014) suggests carrying the term into architectural discourse when a temporary building which can be defined as a nomad builds up its existence by benefiting a host building that has already taken its place in

a certain context. Adapting to the host's conditions, benefiting from its structure, and creating a brand new aesthetic discourse gain an invasive attitude in this type of nomadistic structure (McDaniel, 2008). Here the host is already self-sufficient while the unexpected nomad guest depends on the host building structurally by imposing burdens on it (Figures 3-4).

While flexibility and temporality are the notions of nomadism, surprising adaptability brings out a new side of the parasitic attitude. This attitude is explained as "utilizing idle terms" and developing its architectural meaning as attractive terms (Yorgancıoğlu & Güray, 2018). Hence, transforming an idle space into an attractive context is the main concept of parasitic architecture which offers urban aesthetics new dimensions of possibilities of idle areas. Using instant conditions, offering new and unexpected codes, and struggling with instant conditions brings out a non-bureaucratic attitude which can be discussed under the rhetoric of Adhocism towards design.

Ad hoc Notions of Parasitic Architecture
While temporariness of space brings flexibility to rigid relationships between design and place, this can be comprehended as the very notion of the Ad hoc approach for its improvisational approach towards current situations. Adhocism is simply defined as a strategy for finding specific solutions for certain problems in the most simple, effective, creative, and economical ways (Jencks & Silver, 1972). The

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art of answering design problems in an Ad hoc way creates a ground for temporary solutions depending mostly on planned improvisation. The etymology of the term "Ad hoc" origins from the saying "for–this" in Latin languages and references a specific level of problem-solving strategy which cannot be generalized or standardized (Hays, 2000). Nonetheless, notions of Adhocism are seen to be defined as a social form of the organization against bureaucracy until the early ages of late modernism. Ad hoc design strategies were mentioned on academic platforms firstly by Charles Jencks and Nathan Silver in their book "Adhocism: The Case for Improvisation" (Jencks & Silver, 1972) (Figure 5).

Figure 5: Madonna of The Future by Charles Jencks, 1968 and Dining Chair by Nathan Silver, 1968 (Erdil Polat, 2017)

According to Jencks and Silver (1972), the saying Adhocism is taking a post-industrial material that ran out of order, combining it with new materials, and giving it a brand new

mission surprisingly inappropriate for its creation. The tension between old and new and electricity to the exciting feeling of the surprising function of the material; is the key to creating a language based on surprise. Surely, this new language is the main concentration area of the storyteller side of postmodernism by mentioning "Normal is boring". While Ad hoc design offers a surprisingly striking solution through its odd language of aesthetics by using an ordinary material in an extraordinary style, it has created its own motto as "Normal is the new weird" and uses the norms as the elements for achieving weirdness. (Figure 5). Talking about spatial experiences, primary examples of Ad hoc design organization can be examined in early-hippie settlements of the 1960s such as Drop-City in North Colorado, an experimental settlement built in 1965. This experimental settlement which created spaces out of non-functional post-industrial materials are used by a group for a couple of years until they decided to end the experiment of Ad hoc living. Their notion of Ad hoc settlement shows nomad attitudes as well as non-belonging codes towards the place which show us the rich spatial aesthetics and usage of post-industrial materials that had gone out of order and have been given new usage values later. The attitude of the settlement constitutes of domes made with non-functional materials creates a level of consciousness both nomad and flexible which is implied based on planned improvisation and ecological sustainability (Figure 6).

Figure 6: Drop-City by Clark Richert, 1965-1973 and a solar panel for Drop-City by Clark Richert, 1967 (Erdil Polat, 2017)

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Here, adaptability and flexibility become a common ground for parasitic architecture and Adhocism in the bridge between a notion of nomadism and an improvisational design approach. While parasitic architecture is a guest for a certain host, Ad hoc design is the guest for current situations in unexpected and surprising ways. However, this main common ground can be handled as the direct connection between Adhocism and parasitism based on the design-thinking styles of both approaches, some examples of this multi-layered condition manifest themselves by the notion of "using inappropriate" or idle places for "unexpected functions" by post-industrial materials given a surprisingly new function. These examples are mostly based on using post-industrial materials such as containers in a parasitic approach by using current occasions in an Ad hoc way (Figure 7)

It is possible to take parasitic approaches as an interference option valued by an ad hoc approach towards the idle occasions of urban space. This vision gives parasitic architecture the characteristic of an interdisciplinary context that must be handled in an understanding of urban aesthetics. At this point, Lupo and Postiglione (2009) remind us that every parasitic architecture creates new codes in urban aesthetics which are not been discussed or valued before. Thus, being an unexpected guest to the host place starts another discussion based on renewed urban aesthetics with re-arranged possibilities of idle urban spaces.

The Condition of Idle Sidewalls: A Ground for Parasitic Design

When studies point out that idle spaces are commonly the places that are considered to be a part of urban culture. This point of view makes it necessary to examine idle urban places in social and urban texture. Yorgancıoğlu and Seyman Güray claims two main contexts for that purpose social context and urban context (2018). While social context includes a space recognition observed by urban people in the name of the usage of urban place, urban context creates datums that can be discussed under urban aesthetics.

In this study, when the chosen ground is considered as the idle facades of the buildings, these two contexts mentioned above find themselves a proper representation area both socially and aesthetically studied within the urban texture.

Idle sidewalls, which are born by a necessity of function, generally unconsidered conclusions of instant conditions of the building program. However, they are beloved by early modernist approaches as the perfect results of perfectly smooth surfaces. As time goes by, we encounter

Figure 7: Urban Rigger, floating student housing by Big Bjarke Ingels Group, Copenhagen (URL-2)

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Figure 8: *A small sized structure clinging on an idle façade (Yorgancıoğlu & Seyman Güray, 2018)*

Figure 9: *A parasitic structure clinging to two opposite idle façades (Yorgancıoğlu & Seyman Güray, 2018)*

the fact that they became a surface for advertising by post-industrial tendencies that evaluate every hallow scope as an opportunity for consumption culture (Figure 8, Figure 9). As well as advertisements, they give space for two-dimensional arts and crafts from time to time by urban artists.

By taking inspiration from these examples below, the design studio is concentrated on creating parasitic solutions for idle sidewalls in selected areas of İstanbul, which will be examined under the topic of the experimental report of the studio.

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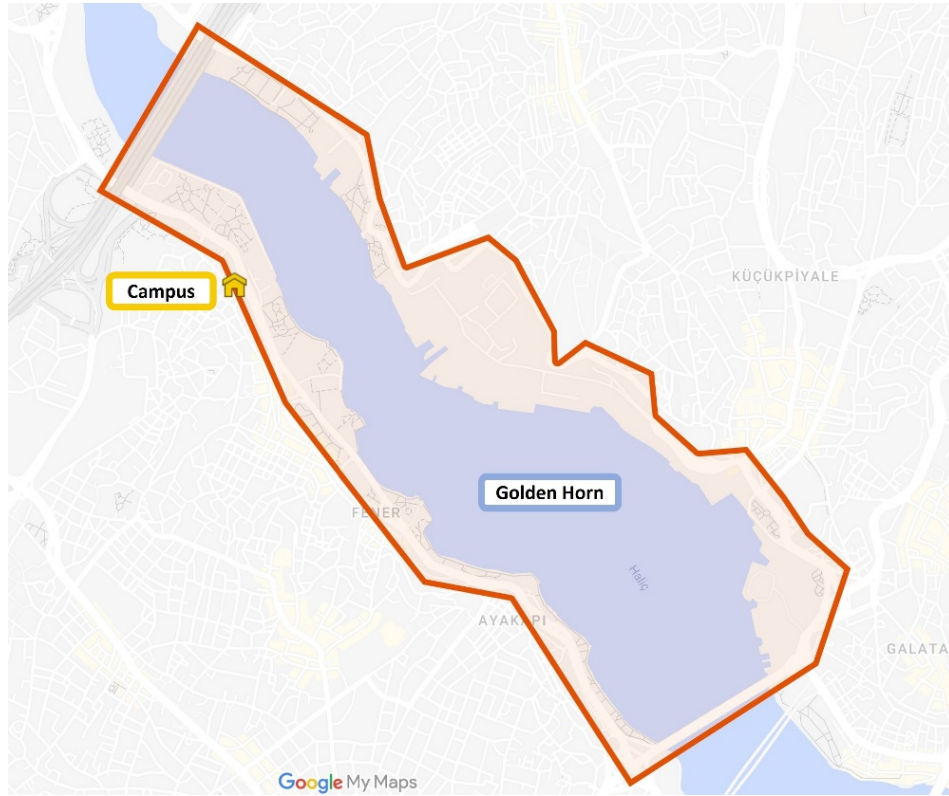
Figure 10: *Map given to students (authors' own work)*

Case Study:

Building on the idle walls and their possibilities mentioned, a design studio for third-year students concentrated on creating functional solutions for sidewalls in the selected streets around Golden Horn, İstanbul, was programmed in İstanbul Topkapı University, Interior Architecture and Environmental Design department in 2021-2022 Spring Semester. In the first course week, students were shown the movie Sidewalls (2011) and a parasitic architecture presentation. And they were asked to determine suitable idle sidewalls around the Golden Horn, where the campus the course was given is also located, from the selected area given in the following map (Figure 10). The selected region is known for its historical references. Nowadays, the mentioned area is functionalized by residences and small businesses, as well as shops, hotels, and restaurants.

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After examining the social tendencies of the region, available idle sidewalls are pointed out and photographed by the students. In the second course week, the instructors have chosen the eight most suitable sidewalls (to be evaluated in the design studio semester) from the student presentations. Available sidewalls are then numbered and redistributed to each student maintaining an equal number of students individually studying each wall (Figure 11).

Available numbered sidewalls are selected by students. After creating the common ground in nomadism, parasitism, and adhocism, the students are asked to study their idea of parasitic architecture for their walls. The main criteria for the design were to build up an idea that meets a specific need of the urban life (in the immediate local surrounding) while consisting of ad hoc design sense by using post-industrial materials that ran out of order. In other words, the function of the to be designed building was also free of choice as well as the structure. This scope needed to be examined by surveys made on the street including determination of the needs according to the expectations of local people and urban life. As a characteristic of parasitic architecture, studies needed to offer new and unexpected codes for the idle spaces of the street while integrating parasitic notions into the walls. At the end of the semester, the most successful design for each wall was determined by the instructors (Table 1).
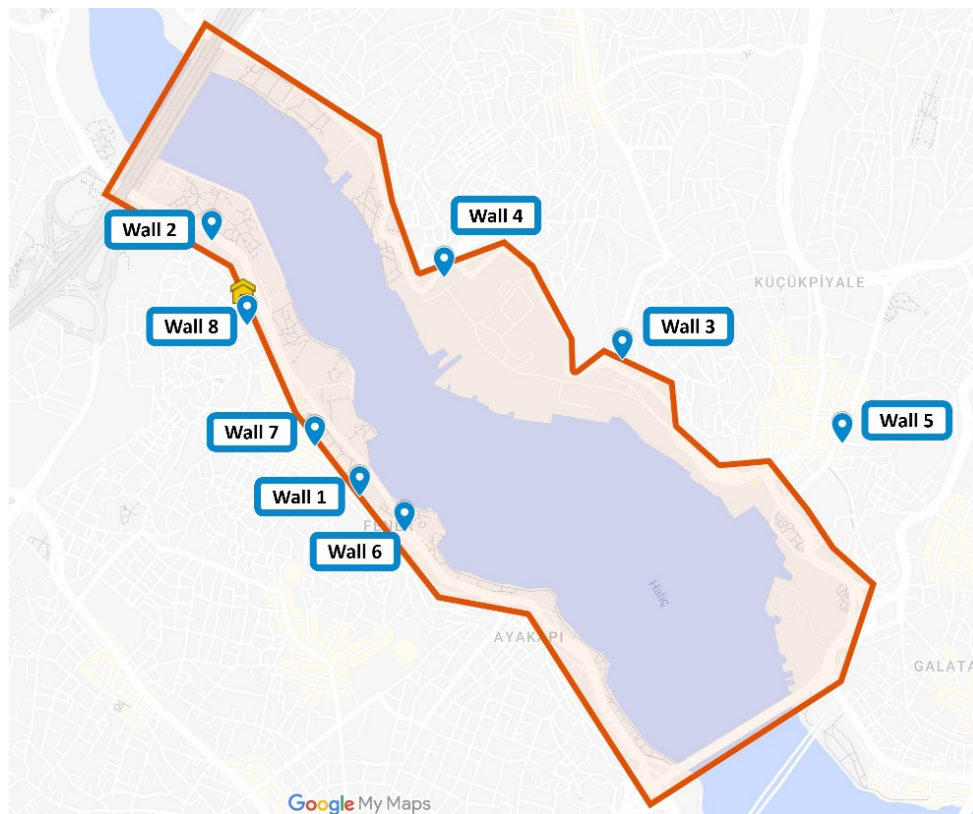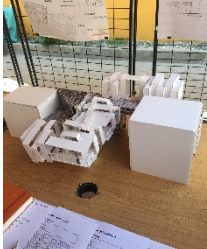

Figure 11: Locations of the selected sidewalls on the given map (authors' own work)

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Table 1: Original walls and student projects

Wall Number	Original Situation	Student Project
1		
2		
3		
4		
5		

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6		
7		
8		
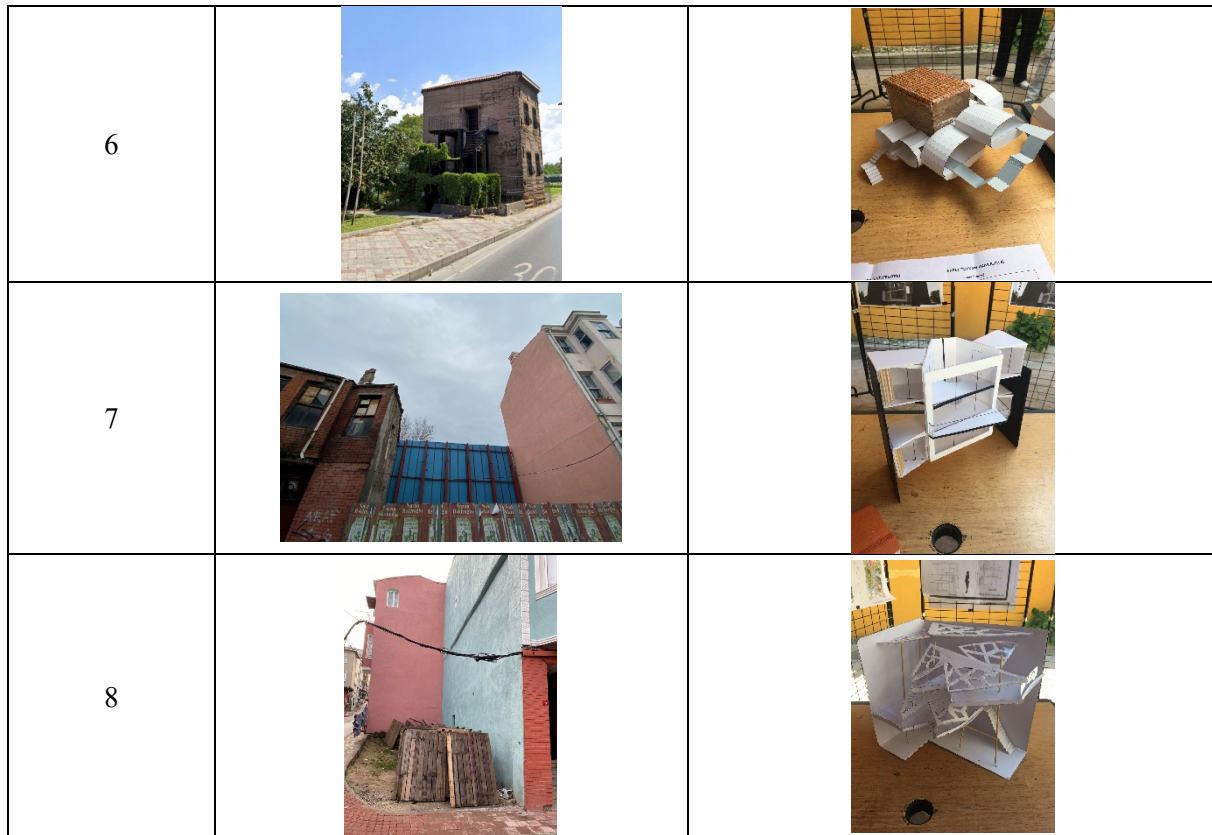
The main selection criteria for the successful projects were as follows: to be designed in a parasitic way along with the mainstream architectural needs, to be shaped in a vertical order clinging on the sidewall, and not to conduct building loads directly to the ground (which is also a parasitic approach criterion), to have suitable reasoning in between the concept and the design.

Conclusion:
Nomadism in architecture has always been an alternative option for the design that refuses doctrinal values of discourses based on certain regional codes. Hence, various nomadistic design approaches can be seen during the history of architecture from Dymaxion Pavilion to Archigram. However, changing views of points develop variational ideas on nomadism which can offer new codes and still be nomad by remaining in the same place. This discussion unifies with archi-bio-political studies which claim to explain biological mechanisms' working principles in architecture. While parasitism represents an avant-garde approach

based on these notions, refusing bureaucratic steps during the process gives the design inspiration for behaving ad hoc already. Discussion among these tendencies shows a common ground for studying parasitic architecture as a nomadistic form of ad hoc design approach. Clarifying this common ground gave inspiration for the design studio to handle idle sidewalls in an adhocratic concept for creating functional solutions in parasitic notions.

Hence, selected idle surfaces of sidewalls on the streets around the Golden Horn created the ground for such an experience. Students created their own idea by observing the functional needs of the street as well as current possibilities of immediate conditions according to the ad hoc design process. Although sidewalls are commonly seen as a surface for advertisements or two-dimensional decorative arts, results of the design studio show that parasitic approaches towards idle sidewalls create new codes by re-arranging the surface with unexpected functions. This surprising side

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of the design examines the relationship between urban space and people experiencing the ambiance of the street. Experiencing functional space options expresses the social context of idle spaces and makes both architects and users think about the possibilities of idle surfaces of sidewalls as a part of urban aesthetics in everyday life.

References:
Bertalanffy, L. (1928). Kritische Theorie der Formbildung. Berlin: Bornträger.

Deleuze, G. (1968) Différence et repetition; trans. Paul Patton (1995) Difference and Repetition, New York: Columbia University Press.

Deviren, A.S. (2001). Mimaride Yer: Yapının Araziyle İlişkisinin Kavrsamsallaştırılması, PhD Thesis, İTU, Instıtute of Science, İstanbul.

Erdil Polat, T.(2017). Postmodern Kültürde Adhokratik Süreçler ve Bir Tasarım Stratejisi Olarak "Adhosizm". Yapı, 427, 56-63.

Fırat, L.H. (2006). Mimarlıkta Mobilite Olgusu Üzerinden İnsan Yer ve Yapı İlişkisine Bir Bakış (A Glance at the Relation of Human, Place and the Building out of the Phenomenon of Mobility in Architecture), İTÜ, Institution of Science, Division of Architecture, Master in Science Thesis, İstanbul.

Foucault, M. (1986). Cinselliğin Tarihi (1986), Trans.: Hülya Turan, Afa Yayınları, İstanbul.

Hays, M. K. (2000), Theory of Architecture Since 1968. Columbia Univ. Press, Columbia.

Jencks, C. & Silver, N. (1972). Adhocism: The Case for Improvisation, Doubleday Company MIT Press, London.

Kronenburg R. (1998). Transportable Environments, E&FN Spon, London.

Lauhmann, N. (1989). Ecological Communication, Tran.: J.B.Jr., Cambridge Polity Press, Cambridge.

Lupo E. & Postiglione G. (2009). Temporary Active-Actions As urban re-appropriation Strategies, Occupation (07): Negotiations With Constructed Space, Brighton.

McDaniel, C.N. (2008). "Strategic Intervention: Parasitic Architecture", MS Thesis, University of Cincinnati, Department of Research and Advanced Studies.

Myburg, J. (2014). "MESOPARSITE", A Symbiotic Affair, Unitec Institute of Technology.

Norberg-Schulz, C. (1980). Genius Loci Towards A Phenomenology of Architecture, Rizzoli International Publications, New York.

Sönmez, N. (2004). Durumcular: Muhalefet İçin Bir Mimarlık, Ms Thesis, İTU, Instıtute of Science, İstanbul.

Şentürk, L. (2013). Mimarlığın Biyo-Politika Sözlüğü (Archi-Bio-Politics), Altıkırkbeş Yayınları, İstanbul.

Taretto, G. (Director). (2011). Sidewalls (Medianeras) [Film]. Rizoma Films, Pandora Filmproduktion & Eddie Saeta.

Yorgancıoğlu D. & Seyman Güray, T. (2018). Alternative Approaches in Architectural Design Education: Parasitic Architecture as a Space Design Strategy Megaron, 13 (1): 144-155.

Zerzan, J. (2004). Gelecekteki İlkel (Future primitive), Trans.: Cemal Atilla, Kaos Yay., İstanbul.

URL-1, Rakowitz, M. (2006). Retrieved 16.05.2022 from
http://www.michaelrakowitz.com

URL-2, Filho, C. (2018). Retrieved 16.05.2022 from
https://www.scandinaviastandard.com/bjarke-ingels-group-and-urban-rigger-bring-student-housing-to-copenhagens-harbor/

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Insight into Research Dilemma in Design Studios and Relationships with the Architecture Curriculum

Rahman Tafahomi

Department of Architecture, School of Architecture and Built Environment, College of Science and Technology, the University of Rwanda, Rwanda

Abstract: Design studios play a significant role to train the students in architecture programs. Studios call as core modules in programs that are supposed to apply the knowledge, skills, and abilities of the students for the design's topic, process, and project. However, the design process follows a tradition in studios based on project design than research activities. The research applied the qualitative content analysis method to analyze the design studio modules' descriptions. The finding of the research identifies that the content of the modules' descriptions does less adapt to research activities. Despite the inductive content explanations, the analysis activities are far from a comprehensive research approach due to the missing aspects in the content of the modules descriptions in the curriculum. In conclusion, research activity is an essential segment of architecture education that has been missing in the curriculum due to the time and location. However, complexity, uncertainty, and variety in the design context remind the necessity of integrating design studio with real-world studio activities through research orientation.

Keywords: Architecture education, Curriculum, Design studios, Research activities, Modules description

Introduction

An architecture design studio as the core module in each semester leads the training process in the architecture program through a project-oriented activity. This process starts from the first year of study and continues until the graduation day based on precedents studies and design projects. In this structure, each design studio encompasses a significant role to combine the design knowledge, skills and abilities of the students in a design project. Design studios are called in terms of the core modules and other courses are supportive courses such as history, theory, and building technology.

The tradition of the apprenticeship training (Mitrache, 2012; Madanovic, 2018) in design studios refers to a process of studies about precedents projects in terms of the study of precedent projects in which designed by elite architects to get inspiration for designing new projects (Drexler, 1975; Draper, 1977; Tafahomi, 2021a). This process of study includes tracing, sketching, redrawing, and repeating those projects (Littmann, 2000; Garric, 2017) to get an idea for the new project in terms of composition in design (Cikis & Ek, 2010; Taura & Nagai, 2013). It means the leader of the studio introduces two or three precedents projects as examples to be inspired by the students for an architecture design project. Seemingly, in this structure, a research activity

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takes into consideration inessential in design studios due to the syllabuses of the course, the structure of the curriculum, and the implementation process.

The report of the Royal Institute of British Architects revealed that current trends in architecture education, firms, and projects are faced with deficiencies in architectural research activities (RIBA, 2014). This problem is not just a personal approach to doing research on the specific trend or interpretation. In fact, it has rooted in the architecture curriculum, program expectation, and learning outcomes that lead the research activities (Tafahomi, 2021b). Despite the studies on the research activity as the new generation of knowledge in the architecture's domain (Groat & Wang, 2002; Niezabitowska, 2018; Antrop, 2013; Deming & Swaffield, 2011), apparently, the research activities have been minimized in the training process of the program.

Research in architecture has been one of the important topics to engage the mind of researchers to discuss, develop, and publish theories, practices, and critics in academic and professional activities in the last two decades (Frayling, 1993; Groat & Wang, 2002; Niezabitowska, 2018; RIBA, 2014). As a matter of fact, the research activities not only emphasize the real research projects in private firms to reach a new knowledge in architecture but also the research is an essential part of the syllabus, curriculum, and the departmental plan to develop common skills in an academic context (Hmelo-Silver, 2004; Madanovic, 2018; Tafahomi, 2021c).

Studies referred to either problem-based or project-based oriented learning processes to support the research activities in the engineering and architecture programs. Studies have recommended problem-based learning for science (Williams & Robert, 1997; Hmelo-Silver, 2004) and project-based learning for practical professions (Blumenfeld et al., 1991; Prince & Felder, 2006; Kokotsaki et al., 2016). In detail, the problem-based learning approach applies to discover the possible answers to a problem through systematic research (Hmelo-

Silver, 2004; Kolmos, 2009) based on self-oriented research. However, the project-based learning approach includes similarities to the design studio process including tasks of projects, precedents studies, and design as the final product (Prince & Felder, 2006; Bell, 2010; Frayling, 1993; Franz, 1994; Tafahomi, 2021d).

According to the curriculum of the program, it is supposed that the students study architecture based on the core design studios, history, theory, and building technology (DoF, 2012). The curriculum anticipates precedents studies, critical thinking, and problem-solving to achieve the learning outcomes (DoF, 2012) although the learning outcomes were described in an implicit way.

In brief, the background of the undergraduate architecture program and curriculum refers to 2008 in the University of Rwanda with inspiration from a reference curriculum from the region. The booklet of the program specification includes the structure, aim and objectives, learning outcomes, and module descriptions. It was revised two times in 2009 and 2012 although the structure and the content remained untouched (DoF, 2012).

Although the curriculum includes a module with the name architectural research methodology, both content and the expectation from this module could fewer meet a research approach in the program (DoF, 2012; Tafahomi, 2021a). The main objective of this research is to analyze the missing aspects of the research approach in the design studios by analyzing the modules description of design studios in curriculum and the implementation of that.

Argument on the Research in the Architecture

Despite the rich literature on the classification of the research into pure and applied (Marshall & Rossman, 2006; Johnson & Christensen, 2014) or applied, strategic, and disciplinary research (Groat & Wang, 2002), the critical view argued that this classification of research unfitted with activities in architecture education (Frayling, 1993). Frayling recommended three

types of research including 'research-in, research-through, and research-for' art and design (Frayling, 1993). However, Till has criticized that three categories less support the outputs of the profession including architectural process, building, and the performance, which need other categories for research in architecture (Till, 2008).

In fact, the argument in architecture research refers to long experience in design studio activities (Frayling, 1993), integration of design studio with the firms (Madanovic, 2018), construction operation and design (RIBA, 2014) than a necessity of a research question (Groat & Wang, 2002). This differentiation is highlighted when the history of the architectural institutes addressed a strong tendency on the apprenticeship style of training in the private firm and technical offices than formal education (Madanovic, 2018), which borrowed from a construction project than academia (Dizdar, 2015). Apparently, research activities in an academic center fundamentally differ from research in a firm office (Mitrache, 2012), in which firms concentrate on the specific request of clients (Blumenfeld et al., 1991), the academia includes a wide range of the themes and topic (Piatkowska, 2016) particularly through research centers in universities (Mitrache, 2012).

Research Methods in Architecture
There are many doubts and questions about the architecture methods in both academia and professional institutions. The study revealed that the research approach in art, architecture, and design is a new topic on the agenda of academia and professional parts that are under development by time and location (Clemente et al., 2017). The studies criticized that the education process in the tradition of architecture training was established based on apprenticeship procedures in which research activities in the context of real users did rarely take place in a design studio (Drexler, 1975; Draper, 1977; Tafahomi, 2021a). Perhaps, for this reason, RIBA (2014) mentioned that research activities are essential for all architects. However, the main reason of the challenging between the academic and practical parts of the

architecture project took place in the transparency, accessibility, and dissemination of data and results (Clemente et al., 2017).

Another key issue in architecture research has been the effects of the transitional process of enlightenment, science, and context on architecture education (Littmann, 2000; Bashier, 2014) that appeared in the proportion of attention to context and creativity aspects in the architecture design studio (Bashier, 2014; Tafahomi, 2021e). The context refers to the social context in the architecture design process (Combrinck, 2018; Tafahomi & Nadi, 2021). In this perspective, the social aspect of the design and contextual factors are highlighted (Lefebvre, 1976; Simone, 2010; Thorpe & Gamman, 2011; Tafahomi, 2021d) in terms of cognitive process and problem-solving (Onal & Turgut, 2017). Contextual aspects of the research have been a core agenda for the activities in the architecture departments in some universities (Combrinck, 2018) with emphasis on the real architectural problem, for real people, in a real context (RIBA, 2014). The approach reemphasizes the contextual and the problem although creativity refers to the project production.

The conceptual paper of Frayling (1993) interpreted the Vitruvian view of architecture in terms of 'commodity, firmness, and delight' for 'construction, utility, and aesthetic' (Proudfoot, 2000, p. 4). In this orthodox view, he assumed three aspects of the analysis in architecture including architecture analysis, criticism, and evaluation. In this foundation, Frayling (Frayling, 1993, p. 3) listed research activities in art and design in three clusters in terms of "Research In, Research For, and Research Through" art and design. He did not detail each approach in the research and endeavored to open the discussion on the topic. However, importantly, he emphasized that all activities in design studios are part of research through design.

Franz (1994, p. 436) articulated research in architecture in three main orientations in terms of 'frame-of-references'. The first orientation he called 'technically oriented research (TOR)'

with three subtitles including systematic, computational, and management. Systematic research refers to the performance of buildings or projects in terms of the efficiency in which the results of the research lead to the typology of the projects and providing of laws and principles. Computational research refers to computer-based technology that provides better detailing, presentation, and expectation. The management frame refers to the architectural tradition to deal with the architecture, education, design and construction in which is attempted to control the process. The second orientation was mentioned in terms of 'Conceptually Oriented Research (COR)' (Franz, 1994, p. 438) which refer to the relation between the researcher and the topic of the research, with two branches including psychological and environmental aspects. The psychological frame refers to the subjective formulation and articulation of the objectives as research topics that from person to person vary. However, the environment frame refers to the social, cultural, and environmental forces that orient the research activities such as participatory and community-based research. The third orientation was called

'Philosophically Oriented Research (POR)' with two frames including epistemological and ontological. The epistemological refers to the self-enlightenment of the research to fulfil the knowledge based on a self-understating of the research activities based on the self-knowledge-acquisition through a personal journey in research. The philosophical frame refers to the human relation and built environment and how the human being develops or limits specific aspects of the development.

Till (2008) mentioned that architectural projects include varieties and so architectural projects could encompass at least three sorts of outputs including 'project, process, and performance' (Till, 2008). Groat and Wang (2002) also recommended a wide range of experimental activities with the more dynamic aspects of the research in the architecture that architects take into action in real projects. They proposed the word strategy for the research than methods and techniques as a continuous stage that results from philosophy and theory of architecture.

The relationship between design and research still is the key question in the architecture

Table 1: *the classification of research activities by Franz*

Title	Subtitle	Specification	Example
Technically Orientated Research (TOR)	with a systematic frame-of-reference	Focuses on the lows and principles	Performance of materials and project
	with a computational frame-of-reference	Computer aid Design	Detailing, rendering, and presentation
	with a management frame-of-reference	Tradition to do the design activities	Education, design, and construction
Conceptually Orientated Research (COR)	a psychological frame-of-reference	The effects of live experience to define the problem	Selection of the problem based on subjectivity
	a person-environment frame-of-reference	Selection of problem due to the cultural and social situation	Social and cultural aspect and effects of design
Philosophically Orientated Research (POR)	an epistemological frame-of-reference	self-enlightenment of the research	Investigation in specific aspect of the architectural design
	an ontological frame-of-reference	Relation between the man and the world	The reciprocal effects of design and context

Source: Adapted to (Franz, 1994)

programs, which also the relationship with art, science, and engineering. Despite the references to research techniques than approaches (Moughtin et al., 1999; Groat & Wang, 2002; Niezabitowska, 2018), some studies on the research activities tended to classify the research into the problem-based and project-based learning approaches in architecture and engineering education. The tendency of project-based learning structure included some similarities to practical professions such as architecture. Apparently, both the experimental approach to learning including the project-based and problem-based learning processes could clarify the interplay with the architecture products. Nonetheless, the thoroughgoing observation of Kolmos identified that the process of the inclusiveness of both problem-based and project-based learning took place in universities at different times gradually (Kolmos, 2009). Perhaps, discussion of both approaches with an architectural lens could illustrate the process for further discourse on the topic.

Problem-based Learning Approach
The critical study recognized the problem-based learning approach in the theory of thought's John Dewey (Hmelo-Silver, 2004) by focusing on pragmatism, functional psychology, and practical learning (Neuman, 2006). This approach was one of the foundations of the cognitive school and constructivism theory in education (Williams & Robert, 1997) based on critical thinking and problem-solving (Barrows & Tamblyn, 1980). Problem-solving takes the position in the classroom when the answer to the problem is not defined clearly and needs extra activities (Seifert & Sutton, 2009; Tafahomi, 2021e). In this way, problem-based learning could expose a variety of methods and processes to answer a single problem (Hmelo-Silver, 2004). It meant that problem-solving is dependent on the self-journey of the researcher (Groat & Wang, 2002; Tafahomi, 2021a). Therefore, this approach facilitates the process of the construction the knowledge (Hmelo-Silver, 2004) through a personal research activity (Williams & Robert, 1997; Tafahomi, 2021b).

Some steps have been listed in terms of common activities in the problem-based learning such as a perception of a problem, presentation of the problem, studies on the problem, methodology and methods, and the results and the conclusion (Marshall & Rossman, 2006; Neuman, 2006; Silverman, 2004; Silverman, 2010). In the light of the exploratory interpretation (Palmer, 1969; Dreyfus & Rabinow, 1982) could illustrate the reason behind each stage of the activities as a logic-driven, which Figure 1 attempts to present this interplay of the process of problem-based learning approach although other researchers used a different pattern to present the stages and the interrelation among those elements (Groat & Wang, 2002; Henn et al., 2006).
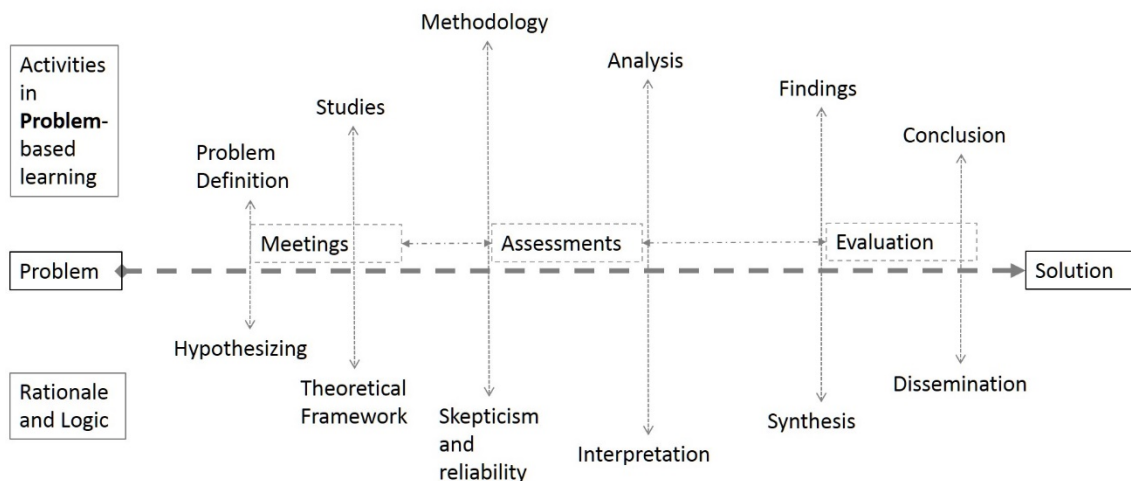

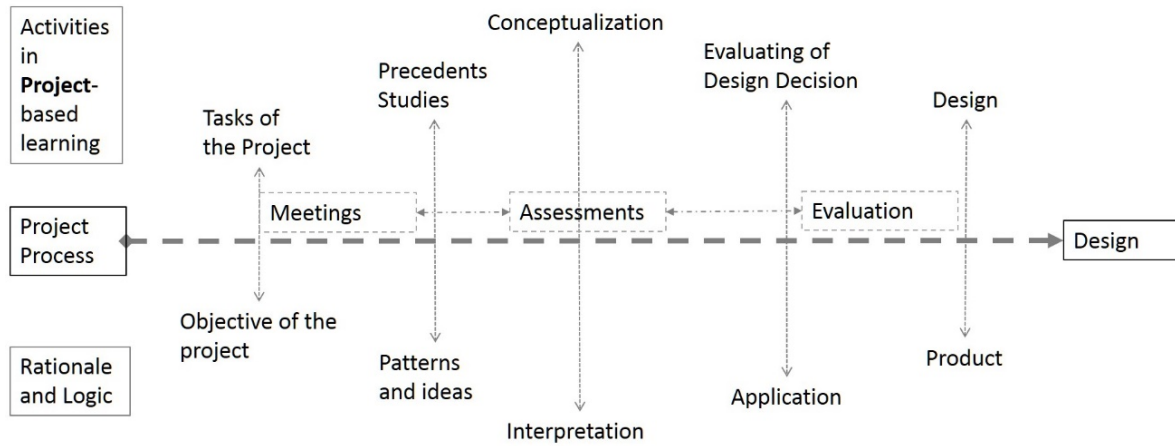***Figure 1:*** *the Process of Problem-based Learning*

Figure 2: the Process of Project-based Learning

Although Figure 1 presents a linear process from the problem definition to the conclusion, the logical process demonstrates the methodology, reliability, and analysis of the problem. Both application and implementation of the results from the investigation and research process are depended on further research or project.

Project-based Learning
The project-based learning also has included a long time of experience in the practical professions such as architecture, construction, and engineering, which literally refers to the physical activities of the learners in the training process particularly through an apprenticeship process in projects (Drexler, 1975; Draper, 1977; Proudfoot, 2000). The activity starts with a specific task to design a final output (Prince & Felder, 2006) such as a concept, building, machine, or a system (Bell, 2010). The studies discussed the advantage of applying the project-based learning in three categories first, self-controlling of the students on the plan of the project, second, the connection of the project with both real and contextual aspects, and third, the application of different methods in the project presentation (Helle et al., 2006). However, the study argued that the project-based research activity is not fitted in the architecture design studios (Roberts, 2007).

The study highlighted the outcomes of project-based activities with some criteria such as self-role, student-center, and a constructivist style of learning from tasks to design (Kokotsaki et al., 2016). Blumenfeld and colleagues also highlighted the role of project-based learning with some important specifications such as the live project, contextual factors, and applicability on the site (Blumenfeld et al., 1991).

It was advocated that this approach enhanced the innovation among the students to achieve significant results (Vreman-de Olde et al., 2013). Although the study evaluated project-based learning as a method full of fun and motivation for the students (Noordin et al., 2011), evidence exposed the high influence of instructors as a superior on the students (Han et al., 2015; Tafahomi, 2021a). By putting project-based specifications in a diagram, both the process and the logic of the activities could form as Figure 2.

Figure 2 demonstrates a linear process in the project-based learning process. In fact, the main activities in the figure are grounded on the task, studies, conceptualization as a prototype, and the design as a product. This process operates through the interpretation of the previous

experience and personalization of knowledge for improving the product than repeating it.

Architecture Design Studio and Research Process

The style of the running architecture design studios has been under critics in recent years (Proudfoot, 2000). At the same time, architecture design studios have been unique and specific courses in the architecture program that perhaps can be compared with an art design studio, which was advocated by the tradition of Beaux Art (Drexler, 1975; Draper, 1977) in terms of 'learning through doing' (Neveu, 2009, p. 26). The design studio is the place where the students work on the studio theme and topic through precedents studios, redrawing, sketching, concept generation and design outputs (Collins, 1979). The process of an art studio and architecture have similarities due to drawing from the real object and drawing from real design projects and products in terms of precedents studies (Frayling, 1993). Despite the common process, each design studio is unique based on the thematic projects and the context of the study. In this case, the leader of the design studio either defines a specific design project or encourages the students to select a project for development through drawing, desk critics, and presentation sometimes in a ritual design studio process (Schon, 1987; Neveu, 2009; Owen, 2009). Despite the varieties of design studios

processes, the design studio may start from either concept development is called a 'protocol' (Schon, 1987, p. 46) or precedents analysis based on the introduced best practice to get inspiration that normally was introduced by the studio leader (Tafahomi. 2021a). This activity in the design studio is included analysis in relation to the precedents that are called research through design (Frayling, 1993) or discovery by design activities (Schon, 1987). Figure 3 conceptualizes the design activities in the architecture studios based on different stages of design.

Nevertheless, the curriculum of architecture programs and studios module descriptions have been important criteria to lead the studio coordinator in the leading process of the design studio. The leader of the design studio arranges the plan of the studio in the orthodox architecture (Collins, 1979) called by Shon in terms of reflection in action through a dialogue between the students and instructor (Schon, 1987) which reminded the ritual and tradition in architecture education (Owen, 2009). However, the structure of the module descriptions, learning outcomes, and the research orientation in the curriculum are critical in the restructuring the research as part of the studio.

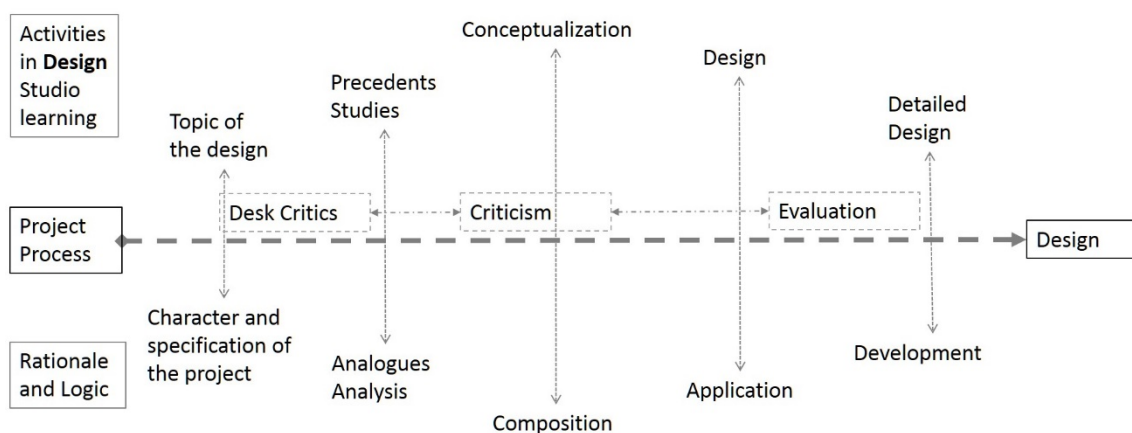In fact, the tradition of the design studio is a linear process although the research process is

Figure 3: Architecture Design Studio Process

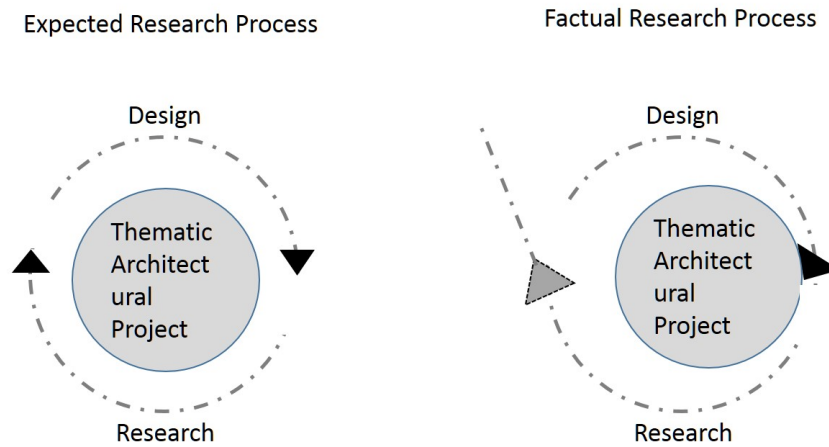Expected Research Process   Factual Research Process

Figure 4: Conceptualization the research and design activities

more widely separated and abandoned from the design topic. The research takes into account the research takes into account a 'counterproductive' action in which drawings result in a design proposal (Stojanovic, 2014, p. 269). In addition, the study argued that the current structure of the design studio is not adapted to the education style in which the students need to understand, remember, and apply (Proudfoot, 2000). Nevertheless, the research activities are not a clear task in the design studio, which was highlighted as a gap in engineering (Fraser et al., 2018). In fact, although the design trends concentrate on the

project, the research trends spread toward other areas to explore more data, aspects, and factors for analysis activities. Figure 4 attempts to conceptualize the trends between design and research activities.

As a theoretical framework of the research, the literature highlighted that architecture design studios trended toward project-based learning. However, the results of the studies about relationships between research and design revealed almost four driven factors that Figure 5 represents the relationships. The relationships took place between four factors including
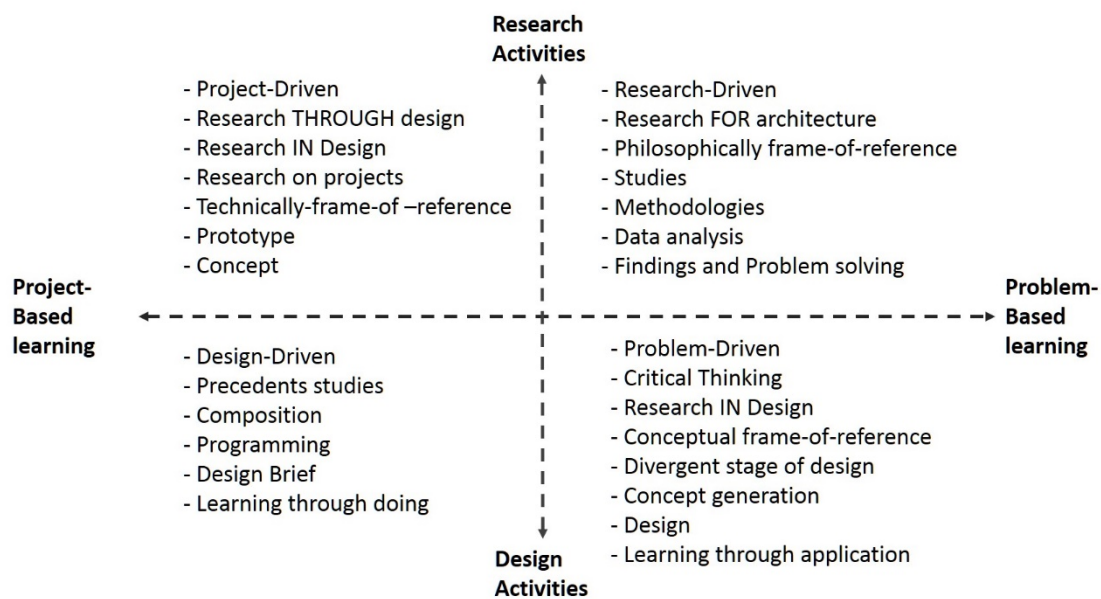

Figure 5: the Research Paradigm in Design Studio

research, design, problem-based, and project-based learning orientations in architecture education. Design-driven refers to a design studio that is focused on the design outputs. The project-driven is oriented toward the specific products in a limited theme, character and specification such as a competition or typical architecture project for the architecture design studio. The problem-driven project is focused on the specifics aspects of the design project to qualify, improve, or enhance the performance or functionality of the specific project. The research-driven projects refer to the research to improve the approach of design related to the context or specific condition of the users or time and location. Seemingly, the content of the syllabus, module description, and curriculum about the design studios' activities, process, and learning outputs have a significant role to lead the design studio toward research activities.

Method and Materials
The methods and material included some sections to clarify the activities were taken into account in research such as methodology, research design, research process, data specification, time and context of the study, and research limitation.

Methodology: similar studies used qualitative research methods for the analysis of the activities in both research and design activities (Groat & Wang, 2002; Lawson, 2005). The researchers applied content analysis (Krippendorff, 2003), ethnographical studies (Schon, 1987), hermeneutic interpretation (Mugerauer, 1995; Proudfoot, 2000), and structured behavioral patterns of the participants in the context of the research (Tafahomi, 2021e; Tafahomi & Nadi, 2021). The content analysis was applied by extracting the meaning of the text and documents with a scientific technique to reveal the meaning behind the words in the important document (Tafahomi, 2021c). Drisko and Maschi theorized the content analysis into three levels of analysis including basic, interpretative, and qualitative analysis (Drisko & Maschi, 2016). This technique was applied to explore the meaning of the text, themes of sentences, and viewpoints of speech, movie, or interview

(Krippendorff, 2003) although Cho and Lee classified this technique under the unobtrusive method (Cho & Lee, 2014). Moretti et al (2011) defined the content analysis in terms of a verified method for classification of the meaning in texts based on the similarities and dissimilarities. Qualitative content analysis was applied widely in different fields of study such as psychology, sociology, linguistics, education, and built environment (Mayring, 2000). Although the critical point of view highlighted the content analysis for verbal data (Schreier, 2012), the studies confirmed the application of this technique in the questionnaire and texts (Elo et al., 2014; Krippendorff, 2003).

In the precedents studies, for example, Carmona applied this technique in the interpretation of the urban design quality in the UK by designing a list of criteria to search in the relevant documents (Carmona, 2001). Lang applied this technique to interpret urban design projects with a phenomenology approach to discover the meaning and objective of the projects (Lang, 2005). In another research, Caliskan and Serce realized that the level of the research-based papers was so low due to thematic words of research with an interpretative approach (Çalışkan & Serçe, 2018) in the interpretation of the typology of the research papers in the education. This kind of thematic research (Vaismoradi et al., 2016) could apply technically to both digital and manual sources (Spannagel et al., 2005).

Research Design: the research was designed based on qualitative methods (Groat & Wang, 2002; Miller et al., 2004; Neuman, 2006; Silverman, 2004; Silverman, 2010) with the application of the content analysis techniques (Krippendorff, 2003) and the interpretative approach (Mugerauer, 1995; Groat & Wang, 2002; Mugerauer, 2014).

The studies highlighted that content analysis is inseparable from interpretation (Krippendorff, 2003; Schreier, 2012). Despite a variety of schools in the interpretation of built environment (Mugerauer, 1995; Mugerauer, 2014; Tafahomi & Lamit, 2013), all of them

dealt with texts, features, and traces (Mugerauer, 1995; Cho & Lee, 2014). To apply the technique in the analysis of the documents, the definition of the list of criteria in terms of units of the analysis was emphasized by studies to discover, analyze, and interpret specific topics, themes, words, meaning (Cho & Lee, 2014) with a concentration on the architecture and built environment aspects (Hancock, 1995; Seamon, 2015).

Research Process: the research process was grounded on analyzing the curriculum of the undergraduate architecture program at the University of Rwanda. The curriculum included 268 pages including the program structure, aim and objectives, learning outcomes, and modules description. To find out those themes, the curriculum was decomposed particularly the aim and content, learning outcomes, inductive content, and learning strategies of the module description of design studios in different years. In addition, the architectural research methodologies module description was added to the analysis owing to the inseparable relationship with the design studios. Therefore, the related variables to the research activities such as themes, keywords, and phrases were extracted and analyzed. Particularly, some keywords and activities took into consideration profoundly to discover the level of research concerns such as investigation, data, methods, techniques, research, analysis, problem definition, and problem-solving.

Data Specification: data included the curriculum specifically the modules description of the design studios and relevant modules such as the research methodologies. Data in the content of the module descriptions were selected based on the words, sentences, and paragraphs that refer to the research activities such as research, analysis, site visit, and exploration.

The curriculum included 2 Basic Design studios in the first year, 6 architectural design studios from the second to fourth year, and 2 thesis design studios in the fifth year. Each module description was structured in 14 sections, 8 parts referred to the teaching, learning and assessments and 6 parts were administrative requirements such as name, code, teaching hours, and approval process. The teaching sections of the modules included aim and content, learning outcomes, inductive content, learning and teaching strategy, assessments strategy, inductive resources, and strategy for feedback and student support. The first four subtitles content the major part of the guideline for the designing of the studio activities.

Time and context: the curriculum of the architecture program was designed in 2009 and revised on 2011 and 2012 slightly. The program run for almost 10 years and the studio's coordinators have had the responsibility for the running the studio. The program included 10 design studios based over two semesters for five years. The curriculum was designed based on the core design studios to train the students based on the practical activities. The theoretical courses were introduced as supportive modules to familiarize the students with other related topics in the studio practical activities. The design studios included portable drawing tables and chairs with around 25 to 35 students to work in both group and individual activities. Some design studios have created links with the communities to get ideas for the design in terms of community outreach such as affordable housing, community center, or kindergarten. Each studio included a syllabus for the design process, a timetable of activities, and desk critics and evaluation in terms of formative and summative assessments. In fact, the curriculum is the key reference for the studio leaders to arrange the design activities through the studio syllabus.

Research limitation: the research was designed based on content analysis of the curriculum to discover the research requirements in the module descriptions. Therefore, the researcher lost the opportunity to get feedback from both students and instructors through interviews to find out their personal judgement about the research activities in the design studios.

Result

The content of the module descriptions of design studios was analyzed per year based on the written curriculum as the official documents in the archive of the department.

First-year design studio: the studios focused on the drawing abilities of the students and the concepts generation. According to the content of the learning outcomes, it was supposed the students learn the activities in the studio through practical activities such as 2 and 3D drawing. The learning outcome emphasized freehand drawing, physical model making, presentations such as pin-up, and communication through verbal presentation. The inductive content referred to the materials and fabrication free of a realistic building design. Seemingly, the content of both modules in the first year was targeted to lead the students for learning architectural elements through redrawing in the design studios.

Second-year design studio: the second year starts with the Tectonic and Order topic that is supposed to introduce the students to the programming and the human condition in the design process. The learning outcomes emphasized the rhythm, order, hierarchy, and proportion in design. The indicative content divided the semester into three parts including the design exercise, context and site research, and design project. This is the first attempt to lead the students in research activities outside of the design studio. For this point, this design studio is also called Architecture and Environment. Despite the title of the research, the activity was introduced in terms of selecting a site and dividing between the students for the partial design than a deep analysis process. The learning strategies were designed based on self-learning, peer-learning, group activities and getting feedback from juries. The second design studio was mentioned Architecture and Society in the second year. The aim and theme of the module was described as architecture beyond of physical form of building and paying attention to social, environmental, and contextual matters. The learning outcomes referred to both precedents and research activities for the design solution to develop a systematic and spatial design solution. The inductive content of the module recommended four stages for the design project including 1) extended site research, 2) small design project, 3) intensive user and public research, and 4) final design project. In the third section, the students have been invited to do research on the public uses and specific user groups to bring into programming for the project.

Third-year design studios: third year includes two studios first Matters and Scales, and second cultural context. Matters and scale leads was introduced as a design project that supposed the students to apply all the lessons learnt in the designing of a small project and develop to a small master plan for the given area or site. The learning outcomes is similar to the other studio just moving forward and backward between the scales was recommended. The inductive content highlighted the site specification and analysis as key criteria for the design including physical, environmental, and behavioral aspects. The teaching and learning strategies referred to the freedom of the students for research and exploration.

The cultural context design studio was supposed that the studio visits historic cities in the East Africa region to get inspiration for the conservation, design, and vitalization in the new context. Therefore, the design project is divided into two parts analytical stage and understanding of the context and situation and the design of the project. The learning outcome focused on the design in the new context and sustainability, however, the precedents studies and research activities were highlighted as key criteria for the design of the project. The inductive content widely invited the students to investigate important criteria in the site for data collection and analysis including environmental, spatial, architectural, contextual, and functional factors. The design of the final project is resultant of the research and analysis process in real sites and contexts. The teaching and learning strategies were similar to the first semester.

Fourth-year design studios: the fourth year includes two thematic design studios including

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urban ecology and participatory design. The aim and theme of the first semester referred to the urban and pre-urban relationship with the architectural design by paying attention to sustainable design through natural systems. The learning outcomes referred to the human and natural relationships and interactions and recommended urban and architectural design strategies to solve complex problems through multidisciplinary thinking. To support the idea, the inductive content recommended the site analysis and conceptual master plan for the design project. The latching and learning strategies are similar to other years, just was added group work and peer-learning process in the design studio. The second semester with the title of the participatory design was supposed to engage different stakeholders in the design process. Despite the unclear aim and theme for the design studio, the urban design projects such as public spaces or public buildings were taken into account as thematic projects. The learning outcomes highlighted social, contextual, functional, and environmental design values for the projects. The inductive content did not develop in a detailed structure and just indicated analysis and urban design and project design phases. The learning strategies repeated previous years and just indicated the guest and community critics in the students' presentations.

Final year thesis design studios: the final year includes thesis one and two as a continuous design project in one academic year. The first semester encompassed three modules including Research and Documentation, Project Programming, Conceptual Design, and the second semester included Conceptual Design and Resolution, Project Presentation, and Architectural Development Process. According to the modules descriptions, the first semester focused on the research, programming, and conceptualization, while the second semester targeted the design solution, project development and presentation. For this reason, the major part of the research activities was arranged in thesis 1.1 research and documentation that was supposed to lead the students for the research activities, the research project, and the thesis project through self-directed studies by the students. The learning outcome indicated using of a variety of methodologies and research results as a platform for design processes and was expected that the students develop arguments in the design-decision-making activities. In addition, the section requested applying the interview technique for users and research backgrounds to respond to a need-based problem. The indicative content listed three topics based on the research activities including research and documentation, self-directed research, and research presentation. The learning strategies referred to one-by-one- meeting with the thesis committee as a supervisory process to lead the research projects. Other modules in the thesis program were supposed to be constructed on the results of the research activities outputs.

Architecture Research Methodologies Module: the students take architectural research methodologies to prepare the backbone of the research requirements for the thesis program in the second semester of the fourth-year. The aim and content of the module underlined research methods, documentation techniques, critical analysis and writing assignments series as a preparation process the students for the thesis project. The learning outcome is a paraphrase of the thesis 1.1 and the inductive content was listed in three tasks the research meanings, data collection and analysis, and reporting of the research. Nevertheless, the module description was free of any detailed information about the qualitative or quantitative methods.

Interpretation of the Results
The results identify that the four sections are engaged to lead the studio coordinators and students in the research activities in the design studios including learning outcomes, inductive content, learning strategies, and architectural research methodologies. The aim and contents are less detailed and without deep description, expectation, and process of research activities in the design studios and generally attempt to draw a general perspective about the themes and topics.

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Learning outcomes: the learning outcomes of the module descriptions include four aspects of learning, A. knowledge and understanding, B. cognitive, skills and application of knowledge, C. communication, ICT, analytical techniques, D. general skills. Despite the differentiation to arrange the topics in the learning outcomes, the major parts of the learning outcomes about the research activities take place in parts A and B such as site visiting and analysis, interview, and graphical analysis. other parts target the same outputs such as integration and application of the theoretical modules in the design studios and the presentation through ICT skills. The similarity of the learning outcomes reduces the specialty of the modules in the different years and topics.

Inductive content: the inductive contents are included both structure and process of the design studio importantly the specific task, sequences, and the relationship between the aim and theme of the design studio, design activities, and the design project. Second and third-year design studios are structured in the four and five stages that the second and third sections of the inductive content reference either research activities or site and context analysis. Despite the linear process, the structure of each task highlights the analytical activities that are expected for the students to undertake in the design studios such as the topic of the project, site and contextual analysis, conceptualization or master plan, design of the project, and detailing. This structure leads both studio instructors and the students to deal with the research activities in the expected structure of the curriculum. Nonetheless, this detailed structure of the inductive content did not exist in the first, fourth, and fifth years of the study.

The teaching and learning strategies: the learning strategy section refers to the strategy of teamwork, individual, presentation, communication and desk critics in the design studio. In fact, the section is included a similarity in the whole modules that the link between each module specification and the teaching strategy of the model is difficult to recognize. Just the thesis module could be

ignored from this similarity due to the thesis committee.

While the architectural research methodologies model is presented in the fourth year to lead the students for the thesis project, the missing research orientation in the whole design studios appears obviously. Not only the design studios are arranged in the style of the linear process of the design but also the theoretical courses as supportive courses are less support the design studios' activities for research orientation activities. Seemingly, one course in the fourth year could less cover the research gap in design studios.

Furthermore, syllabuses include the section for the studio culture that referred to the activities in the design studio such as discussion, critical thinking, physical model making and site visiting. However, the studio culture structure is dependent on the studio leader's approach to how to apply and implement the studio culture due to missing a clear guideline in the curriculum.

In summary, the research activities have been mentioned in the structure of the module description of the design studios implicitly without a specific section or title for it. It was supposed that the instructor of the design studio reformulates the module description to a fitted syllabus for the students and design process for the research activities in and out of the design studio. Although some module descriptions are more structured than others, this structure could not essentially create an opportunity to align the analytical activities in the different years of the design studio.

Discussion
The research activities in an architecture design studio still is a fundamental dilemma (RIBA, 2014; Tafahomi, 2021a) that referred to the epistemology of architecture education (Franz, 1994; Groat & Wang, 2002). This topic resulted in a variety of classification, terminology, and interpretation of the research in architecture education (Frayling, 1993; Franz, 1994; Groat & Wang, 2002; Till, 2008). Importantly, the research activities of architects in both

academia and professional have resulted in either articulation of understanding of the activities such as research through architecture (Frayling, 1993), technically frame of reference (Franz, 1994), and architecture performance (Till, 2008), or applied methods in the research process such as strategies (Groat & Wang, 2002), design generation (Taura & Nagai, 2013), and research techniques and methods (Deming & Swaffield, 2011; Niezabitowska, 2018; Tafahomi, 2021c).

The theory of Frayling as the research-through art, design (Frayling, 1993) and architecture was one of the common approaches to design modules description of the curriculum and specifically the learning outcomes grounded on project-based learning. This approach was adapted to the tasks-oriented activities (Prince & Felder, 2006) based on the instruction of the instructor (Han et al., 2015). Despite the emphasis on the self-role, and students-center in a project-based learning process (Kokotsaki et al., 2016), the content of the curriculum reduced the freedom of the students to do self-design, self-control, and multimethod (Helle et al., 2006) to achieve the outcomes of constructivist approach in the learning process (Williams & Robert, 1997). Both program structure and learning outcomes were muted and left the module under the authority of the instructor to carry out the research by design based on the apprenticeship (Madanovic, 2018; Tafahomi, 2021a). In this perspective, the curriculum included deficiency to develop skills as mentioned by Till in terms of "life-long-learning" (Till, 2008).

The unstructured form of the inductive content of modules description was fitted to the theory of the research by design (Frayling, 1993) as a normal process in the architecture studio design, this approach grounded on the theory and history of architecture in the apprenticeship tradition of learning (Mitrache, 2012; Madanovic, 2018), which unfitted with the contextual and social requirement (Lefebvre, 1976; Simone, 2010; Thorpe & Gamman, 2011; Tafahomi, 2021a). For this reason, the new movement in the architectural departments advocated social aspects of design with the

problem-solving approaches (Onal & Turgut, 2017; Combrinck, 2018).

The module description led the design studio toward the technical research activities with an emphasis on solving small and technical problems such as materials, drawings, and forms of buildings through innovation in the design studio which is similar to the theory of Franz (1994) in terms of technically oriented research. This activity also was called research through design by Frayling (1993). Despite the long background for this approach in the design process, the critical studies challenged the education of architecture programs as an unmodern style of education (Garric, 2017; Madanovic, 2018), an unrealistic context for the design (Drexler, 1975; Draper, 1977), and conceptual than research-based (RIBA, 2014; Tafahomi, 2021a).

The module description of the research methodology course was designed with an eclectic approach to encompass both problem-based and project-based learnings (Hmelo-Silver, 2004; Kolmos, 2009; Tafahomi, 2021c). Despite the content of the module demonstrating the problem-based learning, the learning outcomes of the module fitted the project-based learning. In spite of the argument on the ill definition of both project-based and problem-based learning in the literature (Graaff & Kolmos, 2007), the module description did not overcome this problem. The objective of the module was designed to reach the design solution through programming although this monologue approach was unfitted in the character of the research in terms of many answers for a single problem (Hmelo-Silver, 2004).

The research activities are inseparable activities of the architectural design studios that either was called research (Frayling, 1993; Franz, 1994; Groat & Wang, 2002; Deming & Swaffield, 2011; Niezabitowska, 2018) or design studies (Drexler, 1975; Draper, 1977; Littmann, 2000; Madanovic, 2018; Tafahomi, 2021a). The complexity of the current design processes in the architecture have shifted the design activities from the design studio
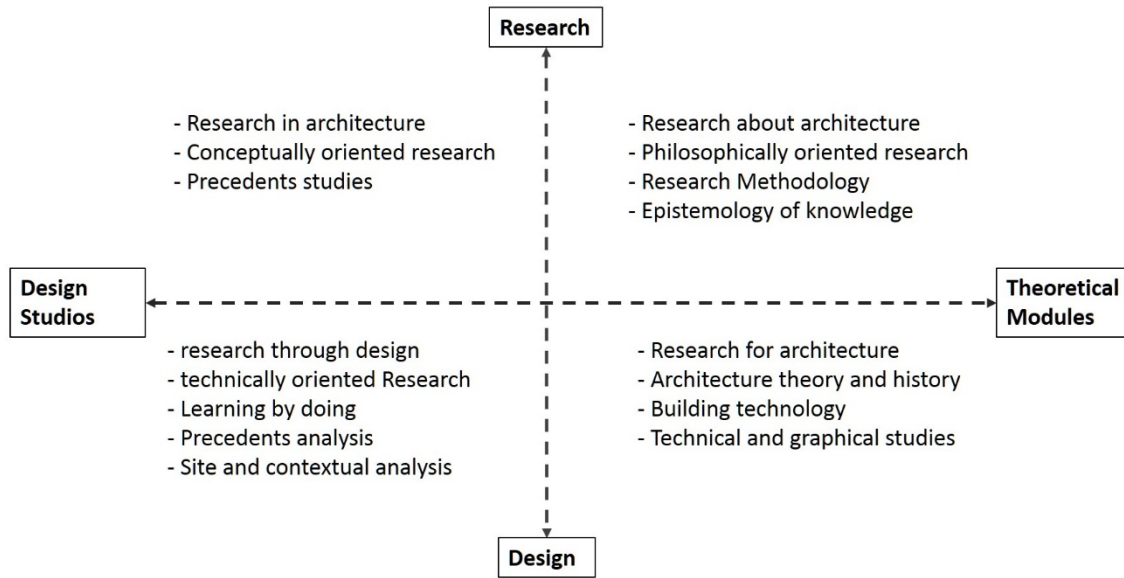
Figure 6: Different Perspective into Research Dilemma in Design

(Drexler, 1975; Draper, 1977; Madanovic, 2018; Tafahomi, 2021a) toward the real project in real-world (Roberts, 2007; RIBA, 2014; Rendell, 2004) in which differentiation, disagreements, and ambiguity have been existed among the field due to the epistemological varieties. Figure 6 attempts to present this variety in academic context.

Conclusion
The curriculum of architecture programs is under revision, updating, and editing progressively based on new findings in both academia and professional domains. The content of the curriculum is going toward more competitive, comprehensive, and educative. The design studios as a core module in the teaching of architecture programs are under many critics, analyses, and discussions to enhance the quality of teaching and learning based on students' needs, professional' requirements, and society's demands. Despite the policy of many universities for research-oriented education, seemingly still there are some institutes a little bit far from the research activities in both curriculum, teaching, and learning processes.

The architecture curriculum is more adapted to the project-based learning process similar to the

other practical disciplines. In this orientation, the design and output of the activity as a product take place as a significant priority in the design process of studios. This process is led by the module description and a drawn syllabus by instructors who have been educated in the same instruction and teach as has been taught. Just a course as research methodologies in the fourth year of the study could not support the research orientation in the design studios. The architectural research methodologies include deficiencies due to the absence of an integrated approach of the problem-based and project-based, which is diminished the objective of the module. Nonetheless, the research module could less be successful without a research approach in the whole curriculum. It means the research approach is an essential part of the whole training process through an updated structure for the curriculum.

Both structure and process of the module descriptions of design studios are so effective on the topics, tasks, orientations, research activities, and outputs of the design projects. The research activities are an essential stage in a design project that brings into account analytical processes for a deep understanding of users, site, and context. Despite the approval of the curriculum in the department, seemingly

there is a variety of styles in the designing of each module description that need essential revision to harmonize the content, structure, process, and learning outcome to enhance the quality of the teaching and learning in design studios.

Philosophically, the architecture field of study and profession has taken the position to add quality to the urban environment through design. For this reason, questioning the future of the world and the built environment has been the main topic for thinking, talking, and critics. Despite the long experience of critics in architecture education, epistemologically architecture education still needs to discover how people and professionals understand the world and urban environment. Knowing the processes, varieties, and aspects of understanding the users about the built environment require a wide range of knowledge, skills, and methods to create collective knowledge about the future.

Multidisciplinary and interdisciplinary approaches take place in many fields of study importantly architecture programs. Specifically, behavioral studies, human perception and understanding, wayfinding and well-being are common topics in the many architectural departments to use questionnaires, interviews, observations, and focus group techniques to discover the users' needs. In addition, more complex techniques such as SWOT (Strengths, Weaknesses, Opportunities, and Threats), PESTLE (Political, Economic, Social, Technical, Laws, and Environmental), and GIS (Geographic Information System), and simulation and animation are connected the architecture department to broader areas for research activities. Apparently, openness to the research activities leads the architecture programs to a wider horizon for discovery future.

References

Antrop, M. (2013). A brief history of landscape research. In P. Howard, I. Thompson, & E. Waterton, *The Routledge Companion to Landscape Studies* (pp. 12-22). New York: The Routledge.

Barrows, H. S., & Tamblyn, R. M. (1980). Problem-based learning: An approach to medical education. New York: Springer.

Bashier, F. (2014). Reflections on architectural design education: the return of rationalism in the studio. *Frontiers of Architectural Research*, 3, 424–430.

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. The Clearing House, *A Journal of Educational Strategies*, 2, 39-43.

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26(3), 369-398.

Çalışkan, M., & Serçe, H. (2018). Action research articles on education in Turkey: A content analysis. KEFAD, 19(1), 80-102.

Carmona, M. (2001). *Housing design quality: through policy, guidance and review*. London: Spon Press.

Cho, J. Y., & Lee, E.-H. (2014). Reducing confusion about grounded theory and qualitative content analysis: Similarities and differences. *The Qualitative Report*, 2014 Volume 19, Article 64, 1-20, 64, 1-20.

Cikis, S., & Ek, F. I. (2010). Conceptualization by visual and verbal representations: An experience in an architectural design studio. *The Design Journal*, 13(3), 329–354. https://doi.org/10.2752/146069210X12766130 824975

Clemente, V., Tschimmel, K., & Pombo, F. (2017). A future scenario for a methodological approach applied to PhD design research, development of an analytical canvas. *The Design Journal: An International Journal for All Aspects of Design*, S792-S802. https://doi.org/10.1080/14606925.2017.135302 5

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Collins, P. (1979). The eighteenth century origins of our system of full-time architectural schooling. *Journal of Architectural Education*, 33(2), 2-6.

Combrinck, C. (2018). Socially responsive research-based design in an architecture studio. *Frontiers of Architectural Research*, 7, 211–234.

Deming, E. M., & Swaffield, S. (2011). *Landscape architecture research: Inquiry, strategy, design*. New Jersey: John Wiley & Sons, Inc.

Dizdar, S. D. (2015). Architectural education, project design course and education process using examples. *Procedia - Social and Behavioral Sciences*, IETC 2014, 176, pp. 276 – 283.

DoF. (2012). Architecture program specification. Kigali: The University of Rwanda.

Draper, J. (1977). The Ecole des Beaux-Arts and the architectural profession in the United States: The case of John Galen Howard. In S. Kostof, *The architect* (pp. 209–238). New York: Oxford University Press.

Drexler, A. (1975). *The architecture of the Ecole des Beaux Arts*. New York: The Museum of Modern Art.

Dreyfus, L. H., & Rabinow, P. (1982). *Michel Foucault; Beyond structuralism and hermeneutics*. New York: Harvester Wheatsheaf.

Drisko, J. W., & Maschi, T. (2016). *Content analysis*. Oxford: Oxford University Press.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open*, 2(1), 1-10.

Franz, J. M. (1994). A critical framework for methodological research in architecture. *Design Studies*, 15(4), 433-447.

Fraser, K., Tseng, T.-L. B., & Deng, X. (2018). The ongoing education of engineering practitioners: how do they perceive the usefulness of academic research? *European Journal of Engineering Education*, 43(6), 860-878. https://doi.org/10.1080/03043797.2018.1450847

Frayling, C. (1993). Research in art and design. Royal College of Art Research Paper, 1(1), 1-5.

Garric, J.-P. (2017). The French Beaux-Arts. In M. Bressani, & C. Contandriopoulos, *The companions to the history of architecture, volume III, nineteenth century architecture, part I: Historicism, the Beaux-Arts, and the Gothic* (pp. 1-15). New York: John Wiley & Sons, Inc.

Graaff , E. D., & Kolmos, A. (2007). History of problem-based and project- project-based. In E. d. Graaff, & A. Kolmos, *Management of Change Implementation of Problem-Based and Project-Based Learning in Engineering* (pp. 1-8). Rotterdam, the Netherlands: Sense Publishers.

Groat, L., & Wang, D. (2002). *Architectural research methods*. New York: John Wiley & Sons INC.

Han, S. Y., Yalvac, B., Capraro, M. M., & Capraro, R. (2015). In-service teachers' implementation and understanding of STEM project based learning. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(1), 63-76.

Hancock, J. (1995). *The interpretive turn: Radical hermeneutics and the work of architecture*. ACSA Annual Meeting History Theory Criticism, (pp. 183-188). New York.

Helle, L., Tynjälä, P., & Olkinuora, E. (2006). Project-based learning in post-secondary education-theory, practice and rubber sling shots. *Higher Education*, 51(2), 287-314. https://doi.org/10.1007/s10734-004-6386-5

Henn, M., Weinstein, M., & Foard, N. (2006). *A short introduction to social research*. London: SAGE Publications.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn. *Educational Psychology Review*, 16(3).

Johnson, B. R., & Christensen, L. (2014). *Educational research: Quantitative, qualitative, and mixed approaches* (5th ed.). Thousand Oaks, California: SAGE.

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277.

Kolmos, A. (2009). Problem-based and project-based learning institutional and global change. In O. Skovsmose , p. Valero, & O. R. Christensen, *University Science and Mathematics Education in Transition* (pp. 261-280). Springer.

Krippendorff, K. H. (2003). *Content analysis: An introduction to its methodology* (2 ed.). New York: Sage Publications.

Lang, J. (2005). *Urban design: A typology of procedures and products*. London: Architectural Press.

Lawson, B. (2005). *How designers think: The design process demystified* (4 ed.). Oxford: Oxford Press.

Lefebvre, H. (1976). *Reflections on the politics of space*. Antipode, 8.

Littmann, W. (2000). Assault on the Ecole: Student campaigns against the Beaux Arts, 1925–1950. *Journal of Architectural Education*, 53(3), 159–166.

Madanovic, M. (2018). Persisting Beaux-Arts Practices in architectural education: History and theory teaching at the Auckland school of architecture, 1927–1969. *Interstices Auckland School Centenary Special Issues*, 9-24.

Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research*. New York: SAGE Publications.

Mayring, P. (2000). Qualitative content analysis. Forum: Qualitative Social Research, 1(2).

Miller, G., Dingwall, R., & Morphy, E. (2004). Using qualitative data and analysis. In D. Silverman, *Qualitative research: Theory, method, and practice* (pp. 325-341). London: Sage Publications.

Mitrache, G. (2012). Sustainable management in academic architecture research. *Procedia - Social and Behavioral Sciences*, 62, 937 – 941.

Moretti, F., Van Vliet, F., Bensing, L., Deledda, J., Mazzi, G., Rimondini, M., Fletcher, I. (2011). A standardized approach to qualitative content analysis of focus group discussions from different countries. *Patient Education and Counseling*, 82(3), 420-428.

Moughtin, C. J., Cuesta, R., Sarris, C., & Laurea, P. S. (1999). *Urban design: Method and techniques*. London: Architecture Press, Second Edition.

Mugerauer, R. (1995). *Interpreting environments: Tradition, deconstruction, hermeneutics*. Texas: University of Texas.

Mugerauer, R. (2014). *Interpreting nature: the emerging field of environmental hermeneutics*. Robert: Fordham University Press.

Neuman, L. W. (2006). *Social research methods: Qualitative and quantitative approaches*. New York: Pearson Education.

Neveu, M. J. (2009). Studia 1 studio. 97th ACSA Annual Meeting Proceedings, The Value of Design (pp. 21-26). ACSA.

Niezabitowska, E. D. (2018). *Research methods and techniques in architecture*. New York: Routledge.

Noordin, M. K., Nasir, A. N., Ali, D. F., & Nordin, M. S. (2011). Problem-based learning (PBL) and project-based learning (PjBL) in engineering education: a comparison. Proceedings of the IETEC'11 Conference. Kuala Lumpur, Malaysia.

Onal, G. K., & Turgut, H. (2017). Cultural schema and design activity in an architectural design studio. *Frontiers of Architectural Research*, 6, 183-203.

Owen, G. (2009). The thesis on the table: Research, pedagogy and identity. 97th ACSA Annual Meeting Proceedings, The Value of Design, (pp. 674-680).

Palmer, E. R. (1969). Hermeneutics: Interpretation theory in Schleiermacher, Dilthey, Heidegger, and Gadamer. Northwestern University Press.

Piatkowska, K. (2016). Moving toward Competence in teaching Architecture: the relationship of research and design in academia. *Procedia Engineering*, 161, 1476 – 1481. https://doi.org/10.1016/j.proeng.2016.08.613

Prince, M. J., & Felder, R. M. (2006). Inductive teaching and learning methods: Definitions, comparisons and research bases. *Journal of Engineering Education*, 95(2), 123–138.

Proudfoot, P. R. (2000). Structuralism, phenomenology and hermeneutics in architectural education. *International Journal of Architectural Theory*, 2, 1-17.

Rendell, J. (2004). Architectural research and disciplinarity. *Architecture Research Quarterly*, 8 (2), 141.

RIBA. (2014). *Architects and research-based knowledge: A literature review*. London: Royal Institute of British Architects.

Roberts, A. (2007). The link between research and teaching in architecture. Journal for *Education in the Built Environment*, 2(2), 3-20.

Schon, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass Publishers.

Schreier, M. (2012). *Qualitative content analysis in practice*. Thousand Oaks, CA: SAGE.

Seamon, D. (2015). Hermeneutics and architecture: Buildings-in-themselves and interpretive trustworthiness. In B. Janz, *Hermeneutics, Space, and Place* (pp. 1-13). Springer.

Seifert , K., & Sutton, R. (2009). *Educational psychology*. Zurich, Switzerland: Global Text.

Silverman, D. (2004). *Qualitative research: Theory, method and practice*. New York: SAGE Publications Ltd.

Silverman, D. (2010). *Doing qualitative research*. New York: SAGE Publisher.

Simone, A. (2010). Social infrastructures of city life in contemporary Africa. *Discussion Paper*, 51, 4-33.

Spannagel, C., Gläser-Zikuda, M., & Schroeder, U. (2005). Application of qualitative content analysis in user-program interaction research. *Forum: Qualitative Social Research*, 6(2), paper 29.

Stojanovic, D. (2014). What is architecture research today and where is the ground? *Serbian Architectural Journal*, 6, 266-276.

Tafahomi, R. (2021a). Insight into a personalized procedure of design in concept generation by the students in architecture thesis projects. *Journal of Design Studio*, 3(1), 5-18. https://doi.org/10.46474/jds.910234

Tafahomi, R. (2021b). The Behavioral Patterns of the Student in the Position of Peer-Jury in Landscape Design Studio. *EDUCATUM – Journal of Social Science*, 7(2), 57-65. https://doi.org/10.37134/ejoss.vol7.2.6.2021

Tafahomi, R. (2021c). An attempt to fill the gap between the architectural studies and conceptualization in architectural thesis design studio. *Journal of Design Studio*, 3(2), 175-190. https://doi.org/10.46474/jds.1012778

Tafahomi, R. (2021d). Application of physical and nonphysical elements in the conservation of historic core of city. *South African Journal of Geomatics*, 10(1), 75-86. https://doi.org/10.4314/sajg.v10i1.6

Tafahomi, R. (2021e). Learning activities of the students in peer-jury practices in the architecture design studio. *AKSARA: Jurnal Ilmu Pendidikan Nonformal*, 7(3), 795-814. https://doi.org/10.37905/aksara.7.3.795-814

Tafahomi, R., & Lamit, H. B. (2013). Hermeneutical phenomenology of interpreting the urban managers: Criticizing on the methodology and process of urban changing committee . *Urban Management*, 33, 127-142.

Tafahomi, R., & Nadi, R. (2021). The interpretation of graphical features applied to mapping SWOT by the architecture students in the design studio. *Journal of Design Studio*, 3(2), 205-221. https://doi.org/10.46474/jds.1019310

Taura, T., & Nagai, Y. (2013). *Concept generation for design creativity* (Vol. 8). London: Springer. https://doi.org/10.1007/978-1

Thorpe, A., & Gamman, L. (2011). Design with society: Why socially responsive design is good enough. *CoDesign*, 7, 217–230.

Till, J. (2008). Three myths and one model. *Building Material*, 17, 4-10.

Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6(5), 100-110.

Vreman-de Olde, C., Jong, T. d., & Gijlers, H. (2013). Learning by designing instruction in the context of simulation-based inquiry learning. *Educational Technology & Society*, 16(4), 47-58.

Williams, M., & Robert, L. B. (1997). *Psychology for language teachers*. Cambridge: Cambridge University Press.

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Tafahomi, R., (2022), Insight into Research Dilemma in Design Studios and Relationships with the Architecture Curriculum

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Book Review

+10 İstanbul Research Workshops 2019

Guliz Ozorhon, Goksu Sarman, Irem Bayraktar (Editors)
Özyeğin University Publication, ISBN 978-605-5625-18-4

Orhan Hacihasanoglu
Ozyegin University, Faculty of Architecture and Design, Istanbul, Turkey

+10 Istanbul Research
Workshops 2019, (+10
İstanbul Araştırma
Çalıştayları-2019)
(2021)
G. Ozorhon, G. Sarman,
I. Bayraktar (Eds.),
Istanbul,
Ozyegin University
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Ozyegin University, Faculty of Architecture and Design, defined three summer internships. The first internship, described as "Summer Internship I (Research) aims to give basic research knowledge to the undergraduate students, as written In the preface of the book. The book includes the explanations created from the "+10 Istanbul Research Workshops" held in 2019 and the presentations of these workshops afterward. The editors of the book are Güliz Ozorhon, Goksu Sarman and Irem Bayraktar. The book's preface begins with the section "Being Articulated into Design Education" by editor Guliz Ozorhon. It is stated that the research workshops discussed in this first chapter take place at the education/research intersection, creating an essential potential for architectural students at the beginning of their

education to learn to research for design. The importance of encountering researchers and undergraduate architecture students in experiential environments is emphasized in workshops created with fiction, such as city readings, case studies, and design studies at different scales. It is stated that students gain experience in producing ideas/products together with meeting and getting to know other actors in the design field.

Invited as a keynote speaker to the meeting where the presentations of the second part of workshops were made by Prof. Dr. Ayşen Ciravoğlu's The title of the article was "Intra/Extra – Education of Architecture". In this article, Ciravoğlu talks about the extra-curricular activities included and not included in the curriculum of architectural education. It is stated that there is a need for new situations in which institutional pieces of training and non-corporate existences interpenetrate and therefore transform each other. External processes such as workshops and competitions should be developed with the informality attached to education, but it is also emphasized that formal education processes should be transformed. It is emphasized that design-build studios, game-based approaches, and in-studio methods that seek the effect of architectural installations on spatial experience, which are the components of these processes, should be considered and implemented. At the same time, it is emphasized that informal environments should be discussed and evaluated with their types, forms, objectives, processes and outputs. However, it is stated that a beneficial climate will emerge when these two processes are carried out together, and their potentials are evaluated together.

3rd chapter and beyond include the explanations of the workshops. Beril Yağmur Tel, Ercan Mutlu, Barış Bayer and Gökçe Perge Oğuz, who are the directors of the "Islander" workshop, also wrote the first workshop section. The name of the workshop and department is "Islander". Istanbul is about the Prince Islands. The workshop, attended by 18 students, included on-site investigations in Büyükada, the largest of the Princes' Islands,

and conversations with the local people about being an islander. In the book, the impressions and evaluations of one of the participating students, Arda Han Sentürk, are included in addition to the information given by the workshop coordinators about the workshops.

The 4th chapter, another workshop "Examination Urban Transformation via Observation, Face-to-Face Interview, and Cognitive Mapping: Emaple of Erenköy Neighborhood," was conducted by Esra Akan, Cigdem Bayram and Hicret Aydogan. The workshop is designed to look at the urban transformation, which is an essential issue for the city of Istanbul, with different research techniques. 9 students attended the workshop. Emre Durgut wrote the students' opinions about the workshop in the book.

5th chapter is entitled"Re-Reading of the modern Architecture Heritage Pattern, " a workshop tutored and written by Sedef Sav, Meltem Çetinel, Elif Gelmez Demir and Furkan Evliyaoğlu. The workshop's focus is the research and evaluation of the modern architectural products of Istanbul, the Istanbul Metropolitan Municipality, the Istanbul Drapers Bazaar, the Zeyrek Social Insurance Institution, the Hilton Hotel, and the Hukukçular Sitesi buildings. 28 students attended the workshop. In this part of the book, Candaş Demir wrote the student's impressions about the workshop.

"Publicness and Utopia" is the title of the next chapter. This chapter was written, and the workshop directed by Göksu Sarman, Merve Özgür, and Onursal Egel. 9 students participated in this workshop. The workshop's main aim was defined as "to think about architectural practice when the speed of change and transformation increased. The objective of the workshop spatial analysis through the concept of publicity to create dream-city images through the transformations and demonstrations of different regions of Istanbul. Gizem Kardeştuncer explained her ideas about the workshop at the end of the chapter.

The 6th chapter of the book was entitled as

"Urban Sound Awareness and Representations", and written by Busra Asti, Melis Keskin, Neval Tarım. They also directed the workshop with the same title. This experimental workshop was organized with 9 students. The workshop aimed to develop a discipline for students to approach the environment from a sonic perspective, and to define and design the environment in a sonic context. The participants produced audio files, posters with mapping and visuals describing architectural interventions, and individual 3d models for exhibition. Betul Ozyetgin as one participant in this workshop, explained her ideas about it at the end of the chapter.

"Waterfront and Space" is the title of the 7th chapter of the book. The transformation of waterfronts in the cities was explained in the first part of the chapter and the changes of the waterfronts of Istanbul and the findings about their interactions with the urban spaces were the main aim of this chapter and workshop as written in the text. Serengul Secmen wrote this chapter and she was tutored the workshop with the same title. 11 students participated in this workshop.

"Bypass in Urban Space: Creative Scenarios" is the title of the 8th chapter in the book. This chapter was written by and the workshop with the same title was directed by Tuba Sari, Didem Gunes Yilmaz, Sylin Aras, and S. Zeynep Yilmaz. Mina Isil Sunan added her opinions about the workshop in the chapter. 24 students attended the workshop.

The last chapter of the book is entitled "Functional Unity" written by Irem Bayraktar and E. Gizem Efendioglu. They also directed the workshop in which 24 students participated. Melisa Sayar wrote her experiences in the workshop.

The "+10 Istanbul Research Workshop" of Özyeğin University Faculty of Architecture and Design introduced different research activities to the young undergraduate architecture students. They had opportunities to participate in ongoing or newly established research studies during their summer internships. While doing that, at the same time, invite the graduates of the faculty to direct these workshops with an open call. Since interactive participation of the graduates is one of the aims of the faculty as written in the preface. The book shows us they reached to both aims. Each chapter of the book included the opinions of the participants and the explanation of the research workshop gives new ideas about how to communicate with the first-year architecture students while research methods are considered. The book can be ordered free of charge from the dean's office of the Faculty of Architecture and Design at Özyegin University.

Book Review

İstanbul as an Endless Space of "Urban Articulation"
(Sonsuz Bir "Kentsel Artikülasyon" Mekânı Olarak İstanbul)

Hulya Turgut, Demet Mutman, Nevset Gul Canakcioglu,
Irem Bayraktar, Hande Tunc (Editors)
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Orhan Hacihasanoglu ⓘ
Ozyegin University, Faculty of Architecture and Design, Istanbul, Turkey

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"Istanbul as an Endless Urban Articulation Space" is the book that includes the studies of the Fourth National Meeting of IAPS (International Association of People-Environment studies) Culture and Space Network. The editor of the book, one of the two

coordinators of the IAPS-CS Network, Prof. Dr. Hulya Turgut, Dr. Demet Mutman, Dr. Nevset Gul Canakcioglu, Irem Bayraktar and Hande Tunc. The workshops, competitions, and articles contained in the content of the national meeting constitute the essential parts of the book. The book has been published by Özyeğin University Press, with Turkish and English summaries.

The foreword by Prof. Dr. Orhan Hacihasanoglu and Prof. Dr. Hulya Turgut is presenting the aims and content of the meeting "Istanbul as an Endless 'Cultural Articulation'", the fourth of the 'National Culture-Space Meetings' series organized by the IAPS-CS 'Culture and Space' international work network.

The second chapter of the book deals with the conceptual, theoretical approach, and context of the main theme of "Istanbul as an endless 'urban articulation' space" which is written by Prof. Dr. Hulya Turgut.

The third chapter is Dr. Levent Senturk' s keynote speech which was titled "Articulation Between the Signs of "Multiplicity" and "Nothingness". The speech and text are based on the artist Fahrelnisa Zeid's 'articulation and Istanbul' painting inspired 1951 work "My Hell" in "Looking at the sign of the multiplicity: From Zeid to Harmonogenesis". He give examples of Simmel's, Lynch's, Tschumi's, Hammond' s approaches about articulation. He discussed the works of The Sonarki subsection is focused on "The Void Gaze". Here, starting with Huyssen' s "Present Pasts discourses; The article in which Casstels explains the foundations of the information age and Zizek's virtual reality and the virtuality of reality continue and complete it with Ashton's "monochord of the universe". The result bears the title of "exit" and states that the subject of "urban articulation" is closer to the sign of nothingness.

The fourth chapter, titled "Design Workshops", discusses the approaches and outputs of the design workshops in the meeting and supported with visuals from the workshops. Dr. Demet Mutman, the coordinator of design workshops,

wrote about approaches in the workshops with the title of "Experiments on alternative aspects of the city" as a subsection in this chapter. The importance of the contribution of non-formal extra-curricular education by practices, workshops, short-term training modules, idea competitions and seminars is emphasized, as well as following-up the formal education process of design education. This section focuses on the relationship between the design workshops held during the meeting and the main theme which was based on "Istanbul as an Endless Urban Articulation Space". Chapter includes the presentation and the visuals of the outputs of the "Instinctive Architectural Workshop" led by Ihsan Oturmak, Seda Oturmak and Feyza Sayman. The second workshop, which was titled as "Visual Articulation of Culture and Communication Infrastructure on a Tram Journey", directed by Alayca Erozcelik and Metin Cavus; followed by "Istanbul as an autopoiesis system / Galata" workshop conducted by Gokce Onal and Arzu Il Varol; "Urban Encounters" workshop conducted by Demet Mutman, Bastian Lange and A. Tugce Ozturk; The "Kent'Hal'i" workshop led by Ayse Okudan and Guher Tan; the last workshop is "İS-TA-N-BUL, Dictionary İstanbul" workshop by Nagehan A. Isbakan, Secil Mungan, and Melis Keskin. All workshops are explained by written information covering the theoretical approach of workshops and visual outputs based on the works of the participants in these workshops.

The fourth chapter is reserved for the student idea competition held with the same title within the framework of the main theme. The chapter starts with the subsection where the coordinator of the competition, N. Gul Canakcioglu, shares the information about the competition. Chapter continues with the subsection where Tuna Han Koc, the head of the competition jury, shares information about the competition process. This section is completed with the projects awarded in the competition and the short report of the competition jury.

The fifth chapter is titled "After the Selected Articles". An article selection process organised before the meeting. Researchers invited to

prepare articles about the main theme of the meeting and reviewers selected some of them to be awarded. The general information about the evaluations made for the article selection is given by Levent Senturk. Later, the articles that received equivalent awards in the article selection process created this part of my book. "Reading Istanbul Articulation Through Secondary Buildings Auxiliary to Construction" written by Basak Eren, Hande Kalender and Atil Aggunduz is the co-awarded first article. The second co-awarded article is "An Urban Attribute in the Layered Whole of Istanbul: Bozdoğan Arch" written by Seda Zafer, Yesim Hafize Desticioglu, and Zeynep Ceren Durgut. The third co-awarded article, written by Siddi Zeynep Yilmaz, is titled "An Articulation Analysis at the Interfaces of Istanbul: The Example of Ataşehir Barbaros Neighborhood". "Cendere Valley as a Palimpsest Urban Area and Ayazağa Neighborhood" prepared by Emine Ecem Kırtaş is another article that received an equivalent award. Pınar Geckil Karaman' s article "Space' as a Tool in the Destruction Process of the Border Between the self and the Other" This article also received an equivalent award. The article that received the equivalent award of "A Palimpsest Model for the Visiable and the Hidden Layers of Istanbul" was written by Elif Öztürk. The award-winning article titled "Mapping the Memory: Experience, Representation and Istanbul" has been written by Canan Ganic, Elif Simge Fettahoglu, Sena Ozfiliz and Zeynep Ceylan Gezer Catalbas. The articles which did not receive an award in the article selection are 1) "Markiz: On the Articulation of Space and Culture in Beyoğlu" by İlke Ciritci; 2) Santralİstanbul as an Articulated Industrial Heritage: Itenventions, Transformations and Potentials" by Imran Gumus, Ceyhun Omur; 3) "An analysis of the Urban movements of Georgian Women Migrants in Istanbul" by Ayşe Farahnaz Ozturk; this chapter ends with 4) "From Production to Consumption: Transformation of Bomonti Beer Factory" by Melahat Kaya.

The text explaining the exhibition by coordinators of the exhibition is included in the following chapter which is titled "From the Exhibition". Information about the aims and content of the exhibition is given in the chapter. Numerous visual materials related to the exhibition are the contents of this section.

The book is completed with the visual presentation of the posters of the event and the CVs of those who contributed to the event and the book.

While the book touches on the future, nature and building systems of the Istanbul metropolis, the workshops, competition, selection of articles and the exhibition identify an intellectual connection beyond binary oppositions between the complex, diverse and interacting architectural traditions and cultures. As a result, articles, workshops and competition projects that deal with an endless urban articulation with various tools successfully reveal this feature of the city. The book can be ordered free of charge from the dean's office of the Faculty of Architecture and Design at Özyegin University.

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