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First-Year Architectural Design Studio in Action: Insights from the ‘Timberscapes' Design-Build Experience

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Abstract: The "Design-Build" approach in design studios emphasizes hands-on learning and 1:1 scale production in dynamic environments that encourage teamwork, material understanding, bodily awareness, and collaborative decision-making. This study presents a design-build experience titled “Timberscapes” for the final project in the "Design Studies" studio during the Spring semester of the 2021-22 academic year at Bahçeşehir University, Architecture Department. The project explored collaborative design interventions in the campus's limited open spaces. Over five weeks, students identified campus needs through personal experiences and developed spatial proposals in teams. Three projects were selected involving student participation for different campus locations. In the second phase, due to the unavailability of conditions for their implementation, the projects were further developed with new divisions of labor and expert consultations.

The studio problem emphasized dialogue and negotiation in team-based processes, structured in two stages with changing teams and responsibilities for students. This paper presents the experimental studio process and student outputs, and investigates its contributions for the students. The method involves a literature review of past experiences with design-build method, the pedagogy of teamwork in the design studio, potentials of timber as a sustainable material to be flexibly used in architectural education and presents the current experience as a staged case study. The paper discusses the case study’s gains in creating a dynamic negotiation environment in the first-year architectural design studio, and highlights the practical limitations and future implications of the applied process.

Keywords: First-year design studio, Design-build, Timber, Teamwork, Negotiation

Introduction

Design studios, flexible environments facilitating the integrated development of design knowledge and skills, continue to hold a central role in architectural education across Türkiye and the world, employing diverse pedagogical methods and processes. Today, new searches and discussions on the quality of knowledge, the interconnectedness between knowledge and skills, and the methods of their transfer constitute a broad content in design education (Kararmaz & Ciravoğlu, 2017).

Within this plurality, a common approach called "Design-Build" aims at learning by doing and 1:1 scale production in studio education. Designed with the foresight that the final product will be built, these studios are dynamic learning environments that include themes such as materials, construction techniques, details, bodily awareness and experience, teamwork, flexible process design, and communication with users (Kararmaz & Ciravoğlu, 2017). To these can be added, “feeling the power of co-production, discovering limits, learning collective decision-making processes, being the triggers of observing and understanding each other and making” (URL 1). Some key examples from national and international contexts in this field include the summer internships of METU Faculty of Architecture students (Kolektif, 2022; Önür et al., 2006; Turgay, 2005), and the practices of the Rural Studio established and maintained by its founder Samuel Mockbee and his students at Auburn University since 1993, especially as social responsibility projects in non-urban contexts (URL 2). A recent example from Türkiye in this regard is MEF Faculty of Art, Design and Architecture's Design and Build! Studio. Since 2015, the academic staff and students of the university have been designing and building timber structures with various functions in rural and urban contexts in partnership with local governments, non-governmental organizations, and industry in Türkiye and abroad in the summer (Figure 1).

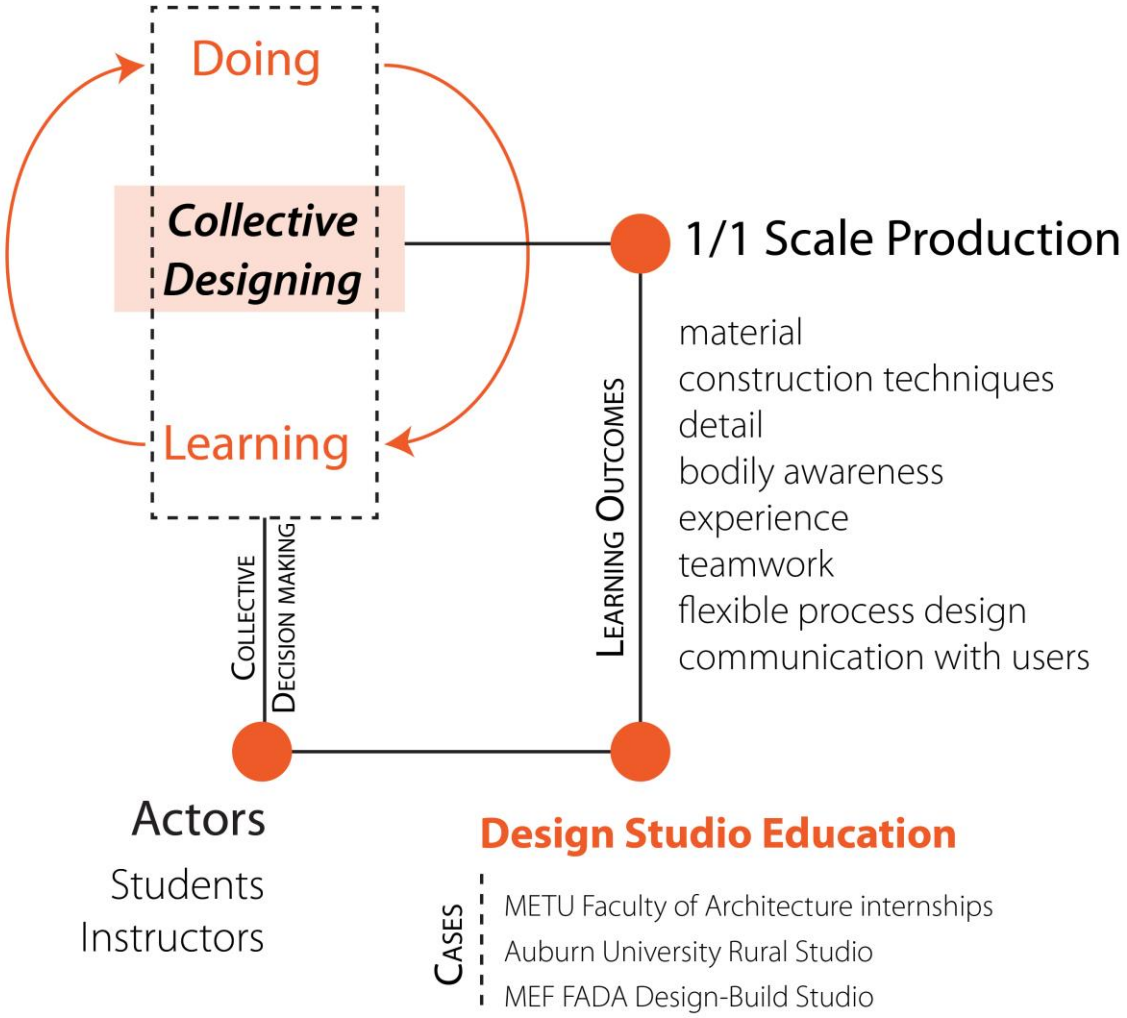

Figure 1: *Design-Build approach as a dynamic learning environment.*

This paper presents a comparable experience designed in response to the post-COVID context of the 2021-22 academic year, right after the extended lockdowns, and implemented during the spring semester of the first-year design studio at Istanbul-based Bahçeşehir University's (BAU) Architecture Department. The first-year design studio serves as an introduction to the broad scope of architectural design and it has a special position among the others due to its high potential to generate innovative methods that are interdisciplinary and experimental. In the presented study, first-year students who had experienced their first-semester studio education online and away from physical interaction during the final stages of the pandemic were introduced a design problem intended to encourage them to engage with their peers and the physical campus environment. This problem prompted them to first consider distancing and then transforming the educational space they had just been part of, stretching its limitations and expanding their experiences through collaborative, team-based projects.

A key point to underline is that the presented studio experience was structured without a predefined focus on future pedagogical evaluation, and thus this paper reflects on the process through experiential insights, student work, and observations rather than relying on pre-planned surveys. The project specifically aimed at initiating a design-build task to get the first-year students in action with teamwork playing a central role, recognizing that their first-semester experience had been online. The three primary objectives of the project were: (1) to initiate a design-build task; (2) to emphasize the importance of teamwork; and (3) to raise awareness of timber as a sustainable material at an early stage of architectural education.

More specifically, the Timberscapes project challenged students to design and construct compact timber structures with flexible programs to be developed for the use of students in the campus's open areas. The process unfolded in two phases: in the first, small teams developed designs for one of three sites over five weeks, culminating in a jury evaluation. In the second phase, larger teams refined the selected projects over the remaining three weeks. The selection process involved student participation, and the projects were planned to be constructed at three different points on the campus as the final part of the studio process. Working with different responsibilities and roles throughout this process, first in small teams and then in larger ones, negotiating within and between teams and of course, with the conditions of feasibility itself, was again at the heart of this problem (Figure 2).

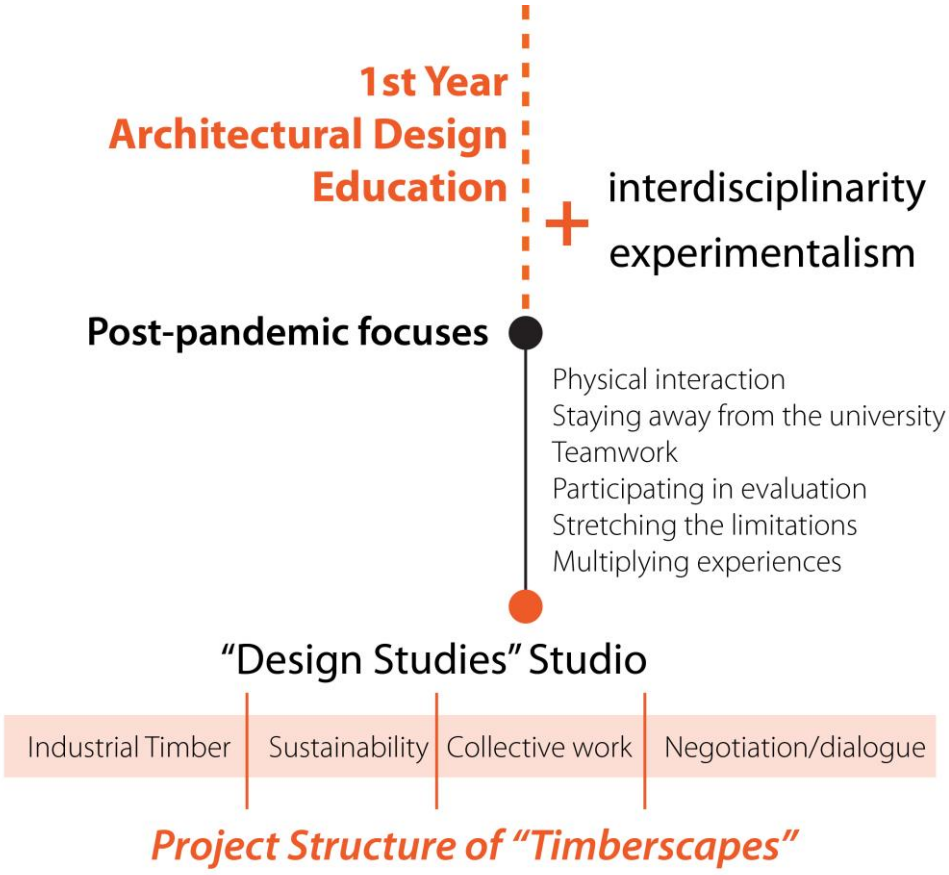

Figure 2: *The focus and structure of the Timberscapes project.*

As with the previously mentioned design-build examples, teamwork was central to the Timberscapes project as a pedagogical model. In architectural education, team-based learning is critical for developing the skills and attitudes necessary for professional practice, as architecture is inherently collaborative. Teamwork skills are considered a vital graduate competency in the accreditation standards for architecture programs in the USA, UK, and Australia (Tucker & Abbasi, 2015). Similarly, the "teamwork and collaboration" competency is included in Türkiye's national architectural education accreditation framework listed under Professional Environment by Türkiye's Association for Accreditation of Architectural Education (MIAK, Mimarlık Eğitimi Akreditasyon Derneği) (URL-3). The potential benefits of teamwork in design education, include the growth of interpersonal and critical thinking skills, fostering active learning, developing abilities to tackle larger tasks collaboratively, enhancing peer learning and capacity for lifelong learning (Tucker & Abbasi, 2015). While conflicts may arise within teams due to differing perspectives, gaining the ability to resolve these conflicts through effective communication is a critical skill in design education (Yair & Press, 2000). Several recent studies highlight the nuanced challenges of teamwork, especially concerning students' diverse and complex perceptions of collaborative processes and outcomes. (Riebe et al., 2016; Thompson et al., 2021; Tucker & Abbasi, 2015).

In addition, research conducted during the COVID-19 pandemic, which necessitated an abrupt shift to online and hybrid education in universities worldwide for the following two

years, underscored the importance of teamwork in design studios, particularly for enhancing students' communication skills and motivation (Fernandes, 2022). Peer assessment within and between groups also supported students' social skills, motivation to learn, and the development of higher-order thinking skills such as critical and independent learning, as evidenced in literature from both before and after the pandemic (Fernandes, 2022; Kocak, 2023). Additionally, it was observed that students' observation and evaluation of each other's work increased their creativity (Kocak, 2023).

One might also question the rationale behind prioritizing the use of timber in this first-year project. Starting in 2020, the Faculty of Architecture and Design at BAU initiated an academic perspective focused on industrial wood and its properties as a sustainable construction material, particularly in terms of its environmental impact, while closely following developments in related construction technologies. Based on the accumulated knowledge in this field, the Timberscapes project was planned as a design-build process utilizing predefined timber components. The next section will elaborate on the motivations for working with timber in the first-year design studio.

Why Timber? Incorporating Timber in Architectural Education

As of 2020, BAU has placed special emphasis on industrial timber and timber technologies, aligning with the United Nations' 2030 Sustainable Development Goals. The aim is to keep timber, which holds a significant place in Istanbul's architectural history, on the academic agenda and integrate it into education to promote a more sustainable and healthy environment in the future. In line with this initiative, efforts are being made to establish a timber technologies workshop at the BAU Kemerburgaz Future Campus. The inclusion of Forest Industry Engineer Demet Sürücü (founder and former coordinator of KUDEB's Timber Training Workshop in the Istanbul Metropolitan Municipality) on the BAU Architecture Department staff has strengthened the focus on timber technologies. This emphasis is reflected in building construction technology courses, the specially developed elective course "Contemporary Timber Buildings and Structural Systems," project studios, and extracurricular activities such as "Timber Talks." Timber Talks is an online event series that brings together a diverse range of experts and professionals—including designers, manufacturers, and technology developers—to present and discuss international developments in timber products and technologies. As a result, students remain informed about advancements and current productions in this field, regardless of their year of study.

The climate crisis is increasingly highlighting the potential of wood as a carbon-emission-reducing and thermally efficient alternative for the construction industry. The preference for industrial timber species such as CLT and glulam over high-carbon-emission reinforced concrete and steel systems is expected to be a significant step forward in achieving the decarbonization target under the 2030 Sustainable Development Goals (Brown & Camilli, 2023). Consequently, wood materials and construction technologies have gained substantial visibility in architectural education, particularly in pedagogies that emphasize the interconnectedness of knowledge and skills, such as design-build and learning-by-doing approaches. Following pioneering examples like the Department of Architecture and Timber Construction (URL 4), established in 2002 at the Technical University of Munich, various architecture schools have started to open wood construction departments. The Center for Wood Innovation at Bern University of Applied Sciences, Architecture, Wood, and Civil Engineering, is exploring new possibilities in architectural education for a sustainable environment (URL 5). In Canada, the newly established McEwen School of Architecture has developed a unique curriculum focusing on the local ecology, resources, and wood production of North America (URL 6).

In addition to institutionally placing timber as the backbone of architecture and design education, many schools of architecture also explore the potential of wood-based materials

and industrial timber technologies in studio courses along with construction technology courses. At the Fay Jones School of Architecture and Design at the University of Arkansas, the "Future of Wood" studio exemplifies this approach (Brownell, 2020). Here, fifth-year students constructed buildings they designed using industrial wood materials they developed from wood dust, sawdust, and similar byproducts. At the University of Texas at Austin, in the "Time for Timber" studio, students from the architecture and interior architecture departments focused on developing new formal and performance-based designs that emphasized the material properties of wood and speculated on new timber construction standards (URL 7). In some institutions, design is seamlessly integrated into technology courses. At the School of Architecture and Planning at the University of Auckland, for example, the Timber Technology course involves students in every stage of the construction process. This includes developing the program and constructing a 10 m² structure of their design, intended to provide social benefits (Chapman et al., 2017). Since 2023, the Association of Collegiate Schools of Architecture (ACSA), an international organization, has awarded the "Timber Education Prize" to design studios. This initiative aims to foster greater interest in wood-based products within architectural education and to encourage innovative and sustainable approaches using timber building systems (URL 8).

Nevertheless, it is apparent that the global interest in wood products and industrial timber materials has not been sufficiently integrated into architectural education in Türkiye. This gap is closely related to the 20th-century shift in Türkiye's building production market, where reinforced concrete—requiring less construction expertise—became dominant, replacing the historically wood-based housing production. Given global trends, high seismic performance and environmental benefits of timber, Türkiye must take steps to reintroduce this material into architectural education. The Timberscapes project seeks to introduce first-year students to timber's potential, early in their education, encouraging innovative uses of the material in future projects and aligning with the faculty's broader mission to promote sustainable architectural practices.

Methodology:

This article provides a comprehensive discussion of the studio's methods, including an explanation of the design problem, an overview of the studio content and an examination of the background that led to the development of this topic. It also outlines the pedagogical processes involved in carrying out the project in teams, including the organization of student groups, their assigned tasks, the evaluation of their performance during role changes, and a brief mention of evolving conditions encountered throughout the process. Furthermore, student outputs, images of studio activities, and personal reflections are included to enrich this narrative.

The Design Problem, the Pedagogical Approach and the Studio Content

The Timberscapes project was built upon three main pillars previously outlined as the studio's objectives. Creating a central place for timber in architectural design education aligns with the faculty's mission of acting as a forerunner in promoting sustainable materials in educational design practices, supporting its commitment to the Sustainable Development Goals. The design-build strategy was considered a valuable pedagogical approach to mobilize, inspire and engage first-year students who had recently returned to face-to-face education in the last phase of the pandemic and were just beginning to explore the possibilities of physical interaction in the studio through an immersive design and build process. Teamwork, essential for design-build projects at a 1:1 scale, was also integral to the Timberscapes project, which aimed to instill negotiation and dialogue skills in students—areas often underdeveloped or neglected during online learning.

In team-based studio practices, students are encouraged to view collaboration as a catalyst for creative innovation, recognizing design as a process that integrates diverse knowledge, perspectives, and expertise, rather than being a

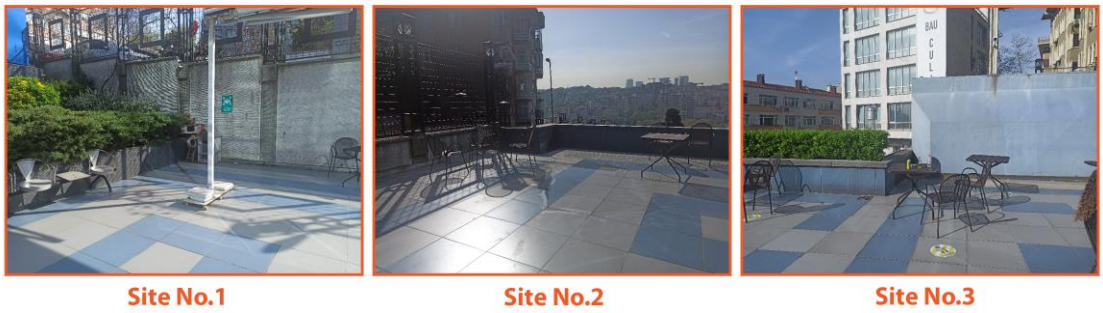

Figure 3: *Three different locations identified on the open terraces of the campus*

purely subjective endeavor (Yair & Press, 2000). Additionally, verbal, digital, and visual tools for articulating and communicating design ideas with peers are pivotal in promoting active learning and skill development (Yair & Press, 2000). Although the advantages of teamwork are widely recognized in the literature, numerous studies highlight the challenges associated with collaborative projects in architectural education, particularly concerning students' experiences and perceptions such as fairness in evaluations, challenges in group formation (e.g., disparities in skill levels or engagement), assignment effectiveness, and the impact of tutor feedback (Riebe et al., 2016; Thompson et al., 2021; Tucker & Abbasi, 2015). In light of these challenges, Thompson et al. (2021) advocate for a shift in educational objectives moving from merely encouraging positive attitudes toward teamwork to cultivating a deeper understanding of its complex and nuanced nature. This shift would emphasize the value of teamwork in fostering a collective spirit, mutual responsibility, and peer support, positioning these qualities as essential learning outcomes in architectural education. Similarly, in the Timberscapes project, it was observed that student collaboration improved throughout the studio process; however, issues such as group formation and the differing skills and perspectives of members continued to cause conflicts.

Returning to the studio content, students were tasked with designing and constructing lightweight timber structures with flexible, adaptable programs for student use, to be situated on the terraces that constitute the limited open spaces on campus. The campus itself is a building originally conceived in the late 1990s as an office complex, featuring vertical circulation and consisting of two 10-story towers located in the densely populated Yıldız district of Beşiktaş, Istanbul. In 2016, BAU leased the building and repurposed it to serve as educational facilities for several academic departments (Figure 3).

The Timberscapes project spanned the final eight weeks of the Spring 2021-2022 semester, serving as the final assignment for the first-year design studio. Studio sessions were held face-to-face, twice a week, for four hours, involving seven sections, each with approximately 13-14 students. The process unfolded in two phases. First, two to three sections were merged to form larger groups, each overseen by 2-3 instructors. This diversity of instruction and the increased number of students fostered a rich environment for generating ideas, encouraging abductive and critical design thinking, and supporting the design process. The expanded group size also provided more options for team formation. During this phase, students formed self-selected teams of three, adhering to the team size limits common in national and international student competitions, developed scenarios, and designed structures for one of three designated sites over five weeks. The phase concluded with a jury evaluation in which students participated, and one project per site was selected.

In the second phase, the studio was restructured into three main groups, each focusing on further

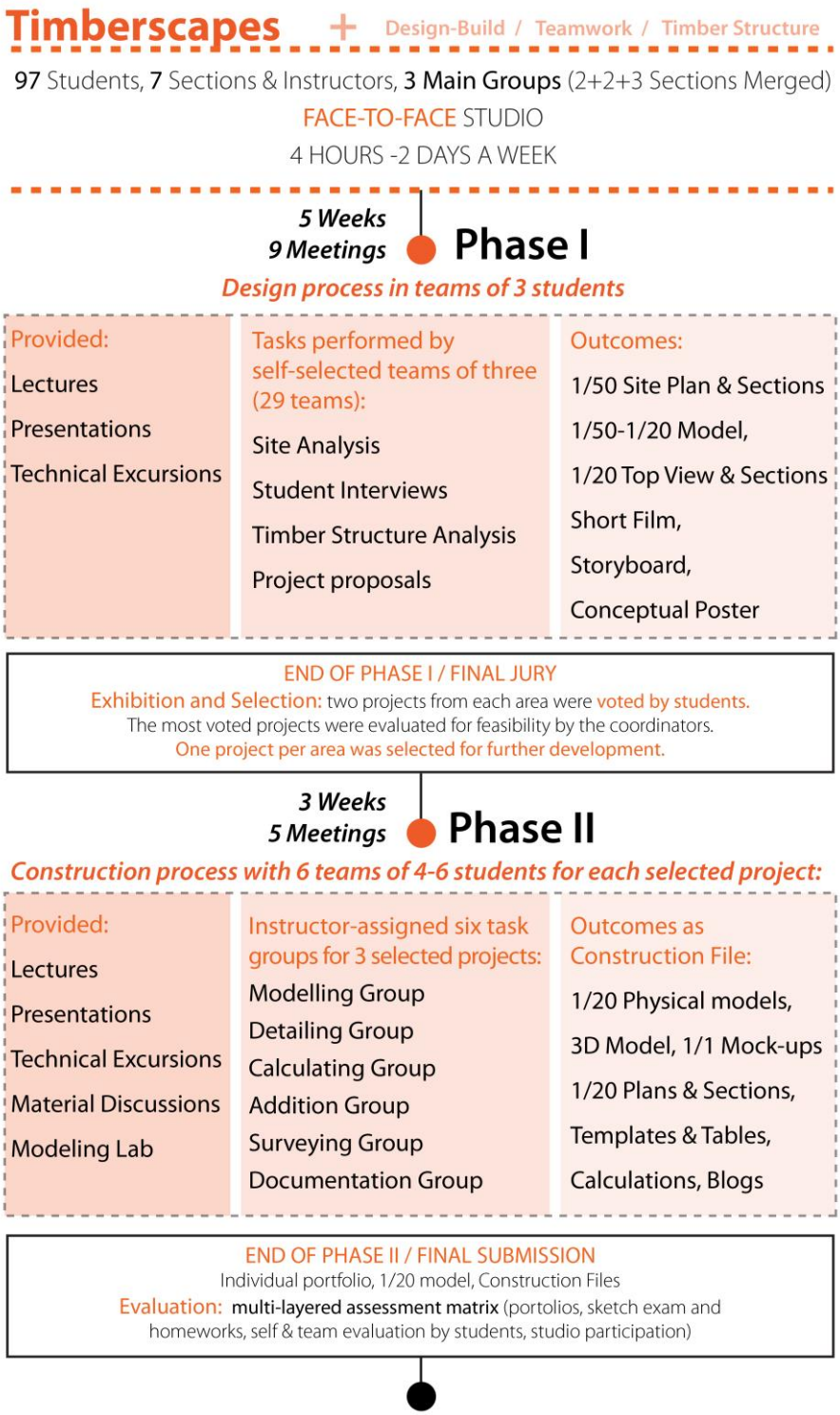

Figure 4: *Organizational diagram of the process*

developing one of the selected projects for the three sites. The projects were refined in greater detail according to six preset tasks, which will be elaborated later. At this stage, instructors assigned teams of 4-6 students to specific tasks for each project. Throughout the process,

students engaged in dynamic teamwork, assuming various roles and responsibilities within their groups (Figure 4).

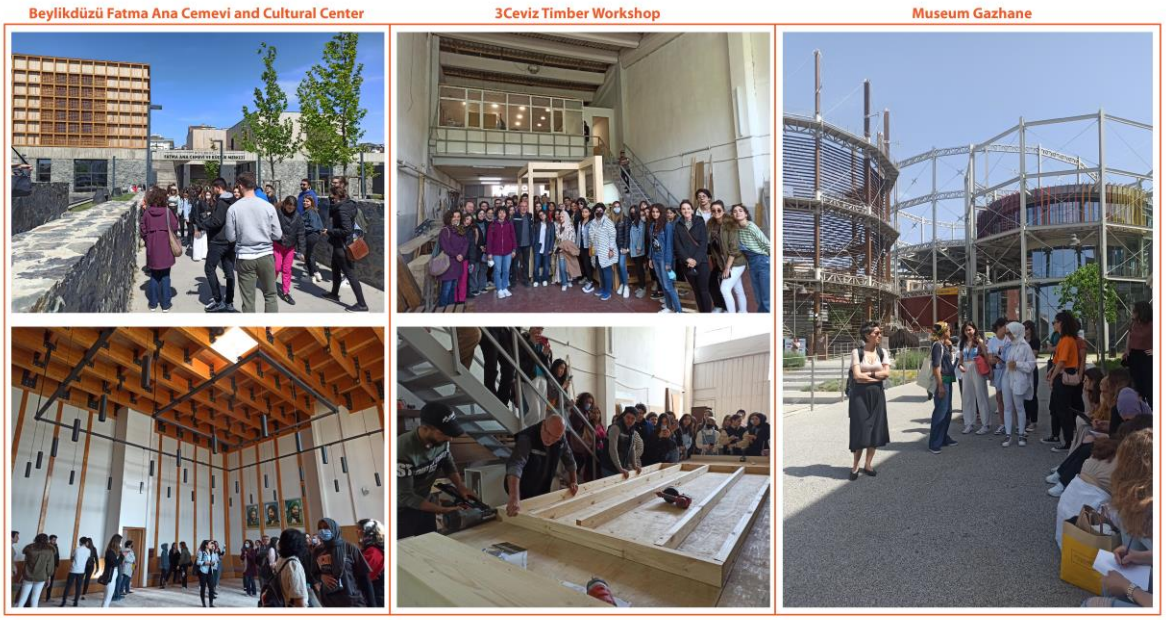

Figure 5: *Photographs from technical excursions*

The Flow of the Timberscapes Project

As outlined above, the Timberscapes project consisted of two phases. In the first phase, the self-selected student teams conducted independent research while participating in seminars and technical excursions. Guest experts were invited to deliver lectures on topics related to the studio problem. For example, architect Mehmet Metin Polat discussed the design and manufacturing process of the timber structure for the main worship space in the Beylikdüzü Fatma Ana Cemevi project, which he designed after winning its design competition. Other guest lectures included Belinda Torus, a BAU faculty member, who spoke on parametric thinking in design, and Demet Sürücü, also a BAU faculty member, who provided examples of contemporary timber construction systems. Technical visits included examining timber construction techniques in the Beylikdüzü Fatma Ana Cemevi's main hall of worship and at various buildings of the Hasanpaşa Gas House Museum (Figure 5). Students also visited a workshop specializing in timber structures, where they closely observed various timber manufacturing details and tools.

During the first two weeks, students selected one of three project locations, interviewed other students on campus to understand their demands and needs, observed the current state of the site, and analyzed their potential for transformation into new spaces with alternative uses and programs for the campus community. They then began developing their proposals based on these defined parameters:

- Must accommodate 5-7 individuals simultaneously.
- Maximum area of 10 m², with a final height of 2.5 m.
- Structural elements made from timber with a maximum length of 300 cm and cross-sections of 5x10 cm, 10x10 cm, 5x5 cm, 2x10 cm, and 2x5 cm; secondary non-structural materials may be proposed.
- Versatile for various purposes and users.
- Portable and self-supporting without permanent fixtures to the ground or walls.

During the design process carried out as teamwork, students produced technical

drawings, including models, plans, and sections at scales of 1:50 and 1:20, as well as diagrams, storyboards of building programs, and short videos. This process was supported by active in-studio work and bi-weekly discussions with studio instructors. At the end of five weeks, the first phase concluded with a final jury presentation where all student works were showcased and evaluated. This was followed by a selection process that included peer reviews, allowing students to participate in evaluating their own and peers' work (Figure 6 and 7). During the selection phase, each team of three students displayed their models and drawings in the exhibition area and reviewed their peers' projects. The exhibition, which featured a total of 29 projects, culminated in an online voting process where each student selected their top

Figure 6: *Examples of student work presented for selection at the exhibition*

Figure 7: *Phase one final jury, exhibition, and selection of designs*

two projects for each area. Ultimately, one design from the top three vote-getters in each location was chosen for implementation, based on the feasibility of the structure (Figure 8).

When the second phase of the project started with the selected designs, it became apparent that completing the projects by the end of the semester would not be possible. This was due to the significant discrepancy between initial cost estimates from timber producers and new costs arising from economic fluctuations. Consequently, the decision was made to focus on developing detailed plans and manufacturing projects for future implementation. The scope and content of the second phase were thus redefined. Six task groups for each of the projects were established for this purpose: the Modeling Group was responsible for creating AutoCAD drawings and SketchUp models; the Detailing Group focused on researching and developing structural details, connection profiles, and 1:1 mock-ups; the Measurement Group prepared detailed measurements, survey drawings, and material templates; the Calculation Group handled material quantity and cost calculations; the Addition Group addressed additional materials and design elements such as plants and lighting; and the

Figure 8: *Presentation boards of the three selected designs from phase one*

Documentation Group recorded and shared all design processes. For each of the three projects, the documentation groups started an Instagram account and blog to document and showcase

Figure 9: *Instants from the second phase shared by the Documentation Groups' Instagram pages*

their progress (Figure 9). These platforms became crucial for feedback and coordination within the larger team, serving as key tools for tracking work. Members of the teams whose projects were chosen were reassigned to specialized groups focusing on different aspects of the implementation process, fostering effective communication and coordination between the new teams. In contrast to the initial phase, which relied solely on analogue models, the second phase incorporated digital tools such as AutoCAD and SketchUp. The modelling team, now in collaboration with the detailing, measurement, and calculation groups, used these tools to refine the designs. Through practical research and collaborative efforts, the sub-teams identified errors and deficiencies in the cross-sections and material details of the selected projects. They worked together to revise the designs, preserving the core concept while minimizing costs. Highly detailed 1:20 scale models, reflecting the final revisions, were produced to guide the implementation process.

As mentioned above, in the two-phase format of the studio, the initial teams of three members were reorganized, forming new teams with diverse members and new objectives. This restructuring fostered a dynamic environment of dialogue and negotiation, promoting continuous communication within the studio. Throughout the process, students actively utilized the model workshop, where they were offered essential guidance on the use of tools and machines, as well as appropriate modelling and detailing techniques. Demet Sürücü, who introduced timber materials and construction systems at the project's outset, provided ongoing support throughout both project phases. This included assisting with the integration of linear timber elements, detail production, quantity calculation, and budgeting. Thus, over the course of eight weeks, students experienced a collective and participatory design process and gained firsthand experience in a multifaceted project development process that necessitated teamwork and different expertise.

The evaluation and grading of student performances in this process, which relies on different phases and variable group work, is also a significant pedagogical discussion for this project. Consequently, a multi-layered assessment matrix was established to monitor and evaluate both the teams collectively and the individual members within those teams. In addition to the preliminary and final jury evaluations, and the group portfolio for each of the sub-teams and the larger ones, the students were asked to submit an individual portfolio, documenting and self-evaluating their individual participation in their teams (Figure 10). Also, they were requested to evaluate their team members, and these evaluations were included in the grading matrix. Nevertheless, a fair evaluation and assessment of individual performances within such group work proves challenging and necessitates further exploration in future iterations of similar studio projects.

Discussion and conclusion

This studio experience was conceptualized and executed in the post-COVID context of 2022, following extended lockdowns and prolonged periods of isolation for first-year students. The studio problem presented here was developed within this specific context, though a formal framework for evaluating the pedagogical approach was not initially established. As a result, neither the teaching methodology nor the studio outcomes and student responses were assessed through pre-planned surveys. Consequently, this research presents a reflective analysis based on experiential insights, student work, and observations rather than pre-established survey data. Nevertheless, the experience offers valuable outcomes for discussion and future research.

Overall, the project process, structured in two phases, rendered the eight-week duration highly dynamic for both students and studio instructors. The students experienced a productive learning period, engaging in various stages of digital, visual, and verbal communication throughout the design process. During the first phase, they worked in self-selected teams of three, on individual proposals. This evolved into larger, more diverse and instructor-assigned groups in the second phase, focusing on the three selected projects, thus

Figure 10: *Examples from the group portfolios*

fostering a continuous process of teamwork and collaboration in the studio. The selected three projects, originally designed by small groups, were further developed and refined by new, larger groups divided into sub-teams according to predefined tasks. In architectural design studios, students typically concentrate on their individual or team-created designs. This project, however, required them to engage with and contribute to a design that was not originally their own. This unique setup allowed students to embrace and enhance a collaborative design through lively dialogue and negotiation within their assigned roles through multiple team-based activities with changing group size, format and duration. The pedagogical format of

the Timberscapes project provided an opportunity for experiencing efficient communication and division of labor within a team, the strategic use of expert support, and the dynamics of architectural teamwork. Furthermore, the entire process exemplified the management phases of implementing an architectural project, integrating experiences of communication, dialogue, problem-solving, and negotiation.

The inability to fully realize the projects, despite the initial design-build conceptions, was a disappointing outcome for both students and instructors. The volatile economic dynamics of the country likely contributed to this result, highlighting the need for meticulous planning of financial resources in future iterations, from the outset. This includes setting material limits as part of the project criteria. Despite the initial disappointment that the projects could not be realized as envisioned, an encouraging outcome emerged: informal feedback indicated that many students who later enrolled in the elective course "ARC2935-Contemporary Timber Buildings and Structural Systems," available to second-year and above students in the 2023-2024 academic year, had previously participated in the Timberscapes project during the spring semester of 2021-22. Their interest in this course, which focuses on industrial timber building materials and construction systems, appears to be strongly influenced by their first-year experiences with the Timberscapes project. Moreover, the planning and evaluation of the design, development, and implementation phases of the design studio projects under discussion, which involve 1:1 scale production through teamwork, demand careful pedagogical consideration. Ensuring that students acquire the necessary knowledge and skills while establishing a fair and objective evaluation process requires thoughtful planning of each phase. This sensitivity is particularly important due to the inherent challenges and complexities in fostering effective group work, a core element of the design-build approach. Research on teamwork pedagogy also reveals the complex, multilayered relationship between team effectiveness, student motivation, and the teaching of teamwork (Tucker & Abbasi, 2015). It is also suggested that an in-depth understanding of what constitutes effective teamwork is critical for designing teaching methods, assignments, and assessment strategies. In terms of the pedagogical impact of the Timberscapes project, student concerns about fairness in the project selection process during the first phase and discrepancies in team member contributions during the second phase were consistent with findings in the existing literature. As stated earlier, the study did not include a structured research design to gather student feedback or assess the design outcomes. Looking ahead, the tutors' observations will play a pivotal role in refining the process, laying the groundwork for a framework for pedagogical evaluation and assessment. This framework will guide the implementation of future iterations of similarly structured projects, ensuring a more informed approach in the coming years.

To conclude, contemporary approaches and methods in design education are diversifying. There is a growing demand for new forms of architectural education that address current social and ecological issues, adapt to changes in information technologies, and foster interdisciplinary knowledge and skills (Hacihasanoglu, 2019; Pasin, 2017; Wang, 2010). Given that architecture increasingly relies on teamwork due to issues of scale, specialization, and ecological concerns—facilitated by advancements in information and production technologies—the importance of collaboration in architectural education will continue to grow. The COVID-19 pandemic, which led nearly all universities in 180 countries to transition to online learning in March 2020, has further expanded the discourse on architectural education to include online and hybrid pedagogies, marking another significant pathway for the future of education. Through reflecting on these evolving educational models and integrating innovative, collaborative and responsive pedagogical approaches, including design and build type hands-on methods, architectural education can better address the complex and dynamic challenges of our built environment and its future.

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