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"Material !Ndeed" Workshop Series as a Hyper-Focus Niche at the Intersection of Material Selection and Architectural Design Tools

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Abstract: This study examines the "Material !ndeed" workshop series held during the summer semesters of 2021-2022 and 2022-2023 at Özyeğin University's Faculty of Architecture and Design. This research assesses the efficacy of "hyper-focused learning," which prioritizes intensive study on a single topic, compared to "hypo-focused learning," which encompasses multiple topics within the same academic semester. The principal objective is to equip architecture undergraduate students with a comprehensive understanding of architectural sub-specialties through a hyper-focused learning approach. The workshops are designed to enhance students' research skills and ability to apply obtained knowledge to various design fields. The workshops offer a complementary learning experience that strengthens their knowledge generation and sharing skills with peer learning. The Material Indeed workshops are configured as a ten-day practice with the participation of fifteen to thirty students, focusing on systematic material selection methods, building components, elements, and conceptual design processes. The initial workshop served as a pilot study, while the second workshop was designed to facilitate the transfer of scientific knowledge to practical applications regarding pilot study results. During the second workshop, students commence seminars on building materials and representational tools, after which they undertake tasks to research and represent the various properties of building materials employed in exterior wall systems. They conduct tectonic analyses of built examples and develop 1/10 scale exterior wall models, synthesizing their findings into the design process. The workshop methodology is based on Kolb's learning process, which combines passive learning through seminars, active learning through research, and experiential learning through model-making. The study evaluates the impact of the workshops on design education, the hyper-focused learning approach, and the educational methods used. A questionnaire applied to participants led to the formulation of a discussion on the potential of hyper-focused learning, intending to improve the quality of design education.

Keywords: Material, Architectonic, Design education, Hyper-focused learning.

1. Introduction

In contemporary architectural education, the field of building technology and materials is the most substantial complement to design studios, along with theory and practice. Materials and building technology education in architecture aims to equip students with the capacity to devise innovative solutions to performance-based design challenges. Additionally, it should facilitate an understanding of the interrelationship between conceptualization, structure-aware proposals, and materiality by integrating tectonic design approaches. Finally, it should enable the realization of the designed structures. (UNESCO-UIA, 2017). As Simon (1973) asserts, by framing the ill-defined design problem in terms of sub-problems that correspond to courses designed within the framework of building engineering and materials science, it is possible for architecture students to transfer the knowledge they have acquired in this area to the architectural design studio (Banerjee & Graaf, 1996). However, the ratio of building engineering and materials science courses to all courses varies between 10.81% and 0.76% in universities located in Turkey. (Çakmak & Akıner, 2021). Besides, most architectural design students prefer to choose from materials they already know rather than conducting a systematic material research and selection process in their design proposals. (Koyaz & Altun, 2015). Furthermore, building technologies and materials courses, which have a comprehensive course load, play an important role, especially in understanding, explaining, and interpreting building tectonics. (Guzelcoban Mayuk & Coşgun, 2020). Considering the considerations mentioned above, it is evident that equipping students with a novel, diversified learning experience that prioritizes material selection and construction technologies represents a significant undertaking in pursuing an efficaciously integrated pedagogical framework. It is therefore assumed that students will develop the capacity to analyze and apply the relations between design, structure, and construction with the help of architectonic tools, thereby enhancing their competencies in producing, transferring, and problem-solving knowledge. In this context, the study focuses on the "Material !ndeed" workshop series, designed as an informal learning niche during the summer semesters of 21-22 and 22-23 within the scope of Özyeğin University Faculty of Architecture and Design Research Internships. The research investigates the effectiveness of "hyper-focused learning" processes, an alternative to "hypo-focused learning," on material selection and its possible contributions to architectural education. The term "hypo-focused learning" refers to a learning process divided to facilitate learning more than one specialized subject in a given period of time. In contrast, "hyper-focused learning" refers to an in-depth study and concentration on a specific subject. In this context, conventional architectural education, which is divided into semesters within the scope of the curriculum and in which different courses on more than one subject are programmed, exemplifies "hypo-focused learning." In contrast, workshops, designed for a shorter period than the semesters of education, align with "hyper-focused learning" processes. The Material !ndeed Workshop series is a ten-day program for fifteen to thirty architecture students during the summer semesters. Its objective is to impart detailed knowledge and experience in building technology and materials to students through diverse educational methodologies. The objective of the workshop is to improve the transfer of knowledge between the processes of designing building elements and conceptualizing designs. This is achieved by enabling students to systematically advance the material selection process in the context of design decisions at different scales. By focusing on building materials, the workshop facilitates discussion of the concepts of performance, aesthetics, and applicability in building design through architectonic tools.

The workshop series is designed as a highly specialized learning environment where theoretical and empirical knowledge is transferred to students through passive and active learning methods. The first workshop of the series was designed as a pilot study. Based on the pilot study's findings, the second workshop was refined to enhance the integration of scientific and empirical knowledge and its application in architectural practice. The workshop employs a combination of passive and active learning techniques. Passive learning methods include seminars on theoretical knowledge, while active learning involves research, analysis, representation, and model production.

In this context, the concepts of materials, components, elements, and systems are viewed as integral to architectural design. The goal is to enhance the students' capacity to employ an interdisciplinary design approach. The active learning structure of the workshop was developed based on the learning-by-doing method and the theory of experiential learning (Dewey, 1938; D. A. Kolb & Kolb, 2013). This approach enabled students to gain theoretical and empirical knowledge in architectural practice through hands-on experience. As the final phase of the study, a survey was conducted to assess the skills and competencies acquired by the workshop participants due to the hyper-focused learning process implemented within the Material Indeed Workshop Series. The survey results were analyzed to optimize the hyper-focused learning approach. Consequently, the potential of the hyper-focused learning process and its contributions to design education are open to discussion, and the roadmap developed is intended to serve as a guide for all actors aiming to improve the quality of design education.

1.2. Approaches in Architecture Education and Workshops as A Hyperfocus Niche

The term "architectural education" can be defined as a process through which theoretical and experience-oriented knowledge is imparted to students through various learning methods. This process provides the conditions for interdisciplinary production in diverse contexts, scales, and environments. It necessitates the integration of multiple actors and parameters, and most crucially, it emphasizes the act of creation and making. In this regard, architectural education requires a configuration that aligns with a dynamic learning state comprising cognitive processes such as understanding, interpretation, and production. Dynamic learning also establishes a connection between diverse types of information (Hollingworth, 1932). This connection can be defined as a multi-step process that reveals the embedded relationships between design processes with different ontological structures and thus accelerates the discovery of new relationships that go unnoticed in the design process. This discovery also corresponds to a proactive cognitive process that triggers critical and creative "design thinking" (Cross, 2011).

However, when considered holistically, design can be defined as an ill-defined problem with ambiguous relationships. This ambiguity can stimulate positive creative thinking (Eastman, 2001; Reitmann et al., 1964; Simon, 1973). This approach is particularly beneficial for novice designers, as it allows them to address complex problems in a structured manner, facilitating the effective transfer of knowledge acquired at different stages of the design process to the subsequent stage. With that aspect, workshops are an effective method for addressing a specific topic that plays a significant role in design processes in detail and creating an effective informal educational environment that develops students' problem-solving competencies at different levels (Güzelçoban, Mayuk & Coşgun, 2020).

Workshops, part of informal education, are also defined as alternative environments where experiential learning methods can be applied (Roberts, 2012). Experiential learning includes acquiring concrete knowledge through new experiences, asking questions about the experience gained through reflective observation and discussing the experience, establishing relationships by conceptualizing knowledge and experiences, and conducting active experiments through physical modeling and prototyping (D. Kolb & Fry, 1973). At this point, learning by doing emerges as an important part of the experiential learning process. Learning by doing can be perceived as neither a simulation of professional architecture nor a direct application of theoretical knowledge in the field, with its own tools and learning outcomes (Gür & Yüncü, 2010). Learning by doing is based on the internalization of the passively acquired knowledge object by the learning subject through experiences (Dewey, 1986). At this point, learning by doing is a proactive method that enables the construction of the cycle of meaning and explanation in the hermeneutic context for the subject who is in the act of learning by building links between concepts (Ricoeur, 1998) and the transformation of data and information into knowledge that can be processed and internalized by the learner. In addition, learning by doing is defined as a set of processes that create opportunities for the learner to acquire knowledge while solving a problem (Anzai & Simon, 1979). In architectural design processes, learning by doing can be defined as representing the data obtained with diagrams, mind maps and sketches that define relationships at the conceptual level, field trips, 3D models and/or digital models and 3D representations and solving a well-defined design problem. At this point, learning-by-doing and experiential learning approaches are very suitable for gaining competence in a specialized subject, solving different design problems, and establishing an effective hyper-focused learning process. However, the process of learning by doing can become a trigger for "doing without learning" as it creates much cognitive load for the student (Roberts, 2012). According to the cognitive load theory, learners can only retain a certain amount of information in their memory during the experience. Therefore, the learning process should be optimized, and the learner's mind should be freed from additional cognitive load and focus only on the necessary experiences (Sweller et al., 1998). At this point, it is estimated that advancing experiential learning processes in a hyper-focused state and supporting them with passive learning methods in which theoretical prior knowledge is conveyed will enable students to have a more efficient learning experience. In this context, Material !ndeed Workshop Series has been designed within a hybrid educational approach that supports the learning-by-doing process with passive learning modules. Thus, it aims to provide students with detailed theoretical and practical knowledge in material selection and building technology from a holistic perspective.

1.3. Material Selection in Architecture

In architecture, the material can be defined as a constitutive element that acts as a bridge between design processes and construction processes, determines the tectonic properties of the building, and ensures that the components and elements of the building are constructed according to the user function and environmental conditions. The fulfillment of the performance criteria determined in the design process can be realized by correctly determining the physical equivalents of the architectonic compositions corresponding to these criteria (Fernandez, 2005). Building materials fulfill different functions in layering with various physical, mechanical, chemical, optical, technological, biological, dimensional, and sensory properties. However, to select the appropriate material for the building components, it is necessary to integrate a systematic selection strategy that covers the scale of the building and building elements into the design process.

When material selection approaches are classified according to architectural, industrial design/engineering and environmental impact perspectives, Balanlı, Japanese Reserach Group, Lohaus and Steinborn, Müller, Cronberg, Sneck Approaches are defined as material selection criteria with an architectural perspective (Koyaz & Altun, 2015).

Although these approaches address material properties at different levels in the context of performance criteria determined considering environmental effects, the location, function, and user characteristics of the building, determining the behavior expected from the material according to different scales has been a common criterion for all approaches. For this reason, it is impossible to advance material selection independently of the building element, structural system design, and the conceptual design process of the building. Material !ndeed Workshop Series has addressed material selection processes as inter-scalar tectonic research to provide students with better comprehension.

2. Method

The Material !ndeed Workshop Series was conducted during the summer semesters of 21-22 and 22-23 as part of Özyeğin University Faculty of Architecture Research Internships. A total of twenty-seven and fourteen undergraduate architecture students, respectively, participated in the series. The workshop's objective is to equip participants with the competencies and skills necessary to translate theoretical knowledge into practice, to access data on building materials through scientific research methods, and to analyze these data comparatively with architectural representation tools. Additionally, the workshop aims to facilitate an understanding of the structures built with a focus on building materials through architectonic tools and to construct inter-scale relationships. In this context, the workshop employs a hybrid approach that combines passive and active learning modules, as explained by (D. Kolb & Fry, 1973). The preliminary workshop of the series served as a pilot study, while the second workshop represents the developed output of the hybrid educational approach. The study workflow is explained in the diagram below.

The method of the study was mainly configured according to the steps of the proposed hyper-focused learning approach. The physical modeling phase was applied to the second workshop as the main case study.

3. Material !Ndeed Workshop Series

3.1 Pilot Study

The pilot study was continued with twenty-seven undergraduate students during the Summer Semester of 2021-2022. Its focus was on the exterior cladding materials used in the building envelope. In this context, the workshop commenced with theoretical presentations on the role of materials in architectural design, the classification and properties of materials, and architectural expression techniques. Subsequently, each student was assigned the cladding materials identified by the instructors. They were then required to contact the

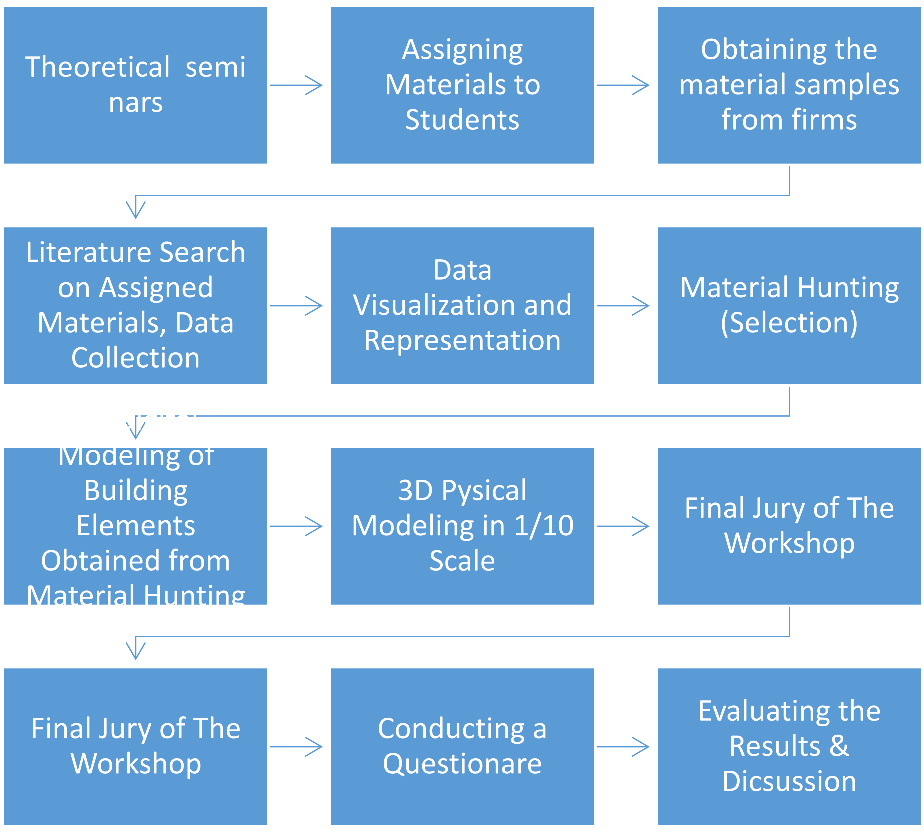
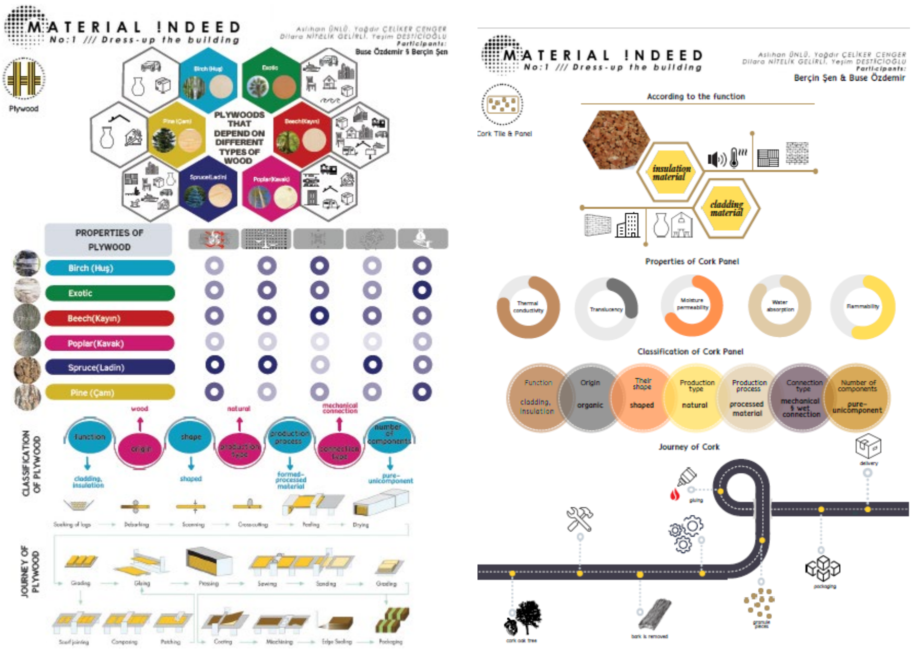


Figure. 1: *Workflow illustrates the method of the study*

Figure 2: *Material Samples Obtained During the Research*

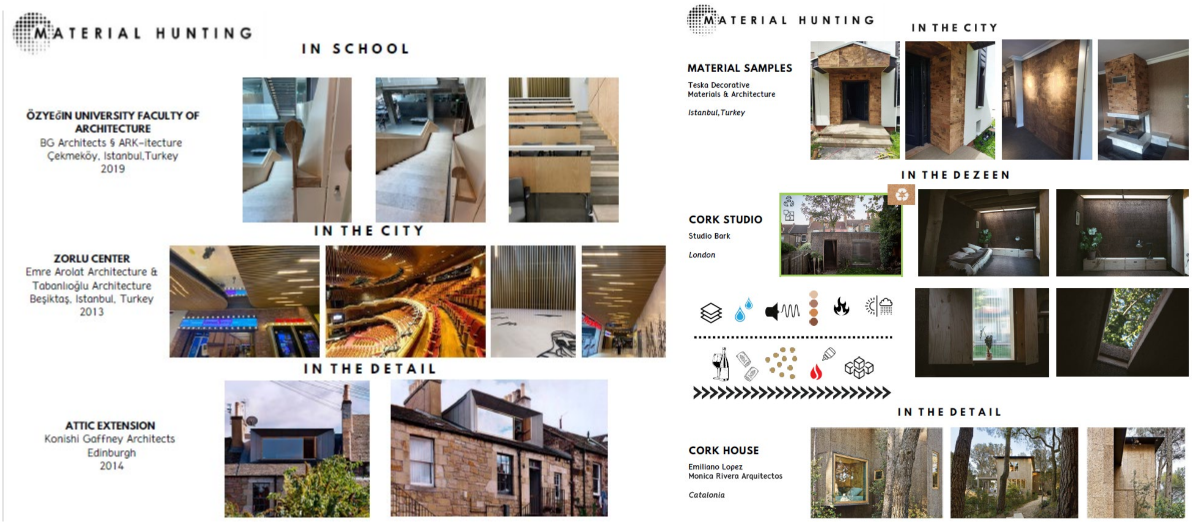
manufacturers of the assigned materials and obtain samples (Figure 2).

The workshop proceeded with a comprehensive analysis of the available literature and data collection from the samples of material obtained. The work was conducted in two groups to enable the students to transfer their knowledge to one another. A practical training session on using digital libraries was conducted to enhance the efficacy of the data collection procedure. Leveraging digital library resources and digital material databases, students conducted a literature search on the properties, production process, and application techniques of their assigned materials. They then analyzed these findings compared to visual and written representations, aligning them with their theoretical understanding of narrative techniques and their prior experiences with narrative techniques (Figure 3).



(a) (b)

Figure 3: *Building Materials Data Collection and Analysis Process (a) Plywood, (Student1). (b) Cork Panel, (Student 2).*

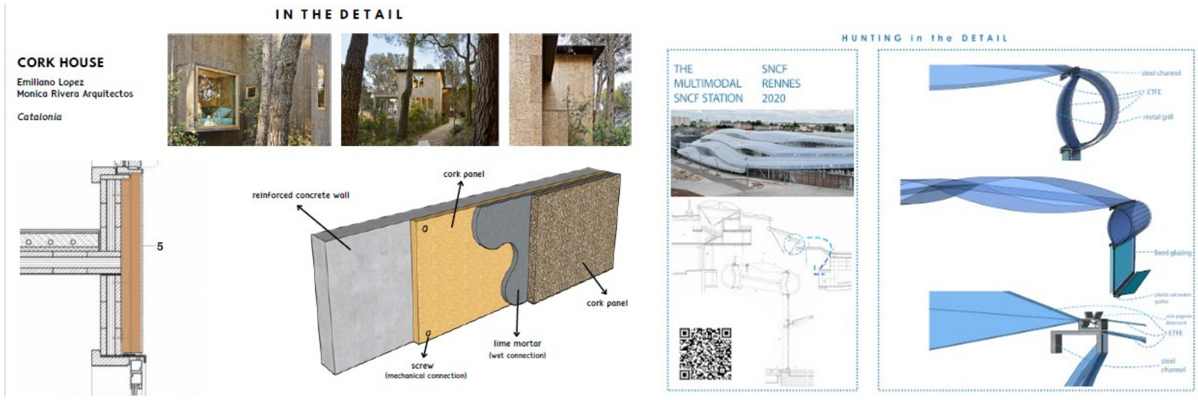


(a) (b)

Figure 4: *Building Materials Data Collection and Visualization Process (a) Plywood, (Student 1). (b) Cork Panel, (Student 2).*

In addition to researching material properties and construction processes, students went on a material hunt (selection) as a gamified research step. They used their assigned materials to examine the buildings built in the city, on campus, and in Detail magazine. Thus, they had the opportunity to explore the different uses, application methods and techniques, and visual effects of materials through built examples (Figure 4).

The final step of the workshop involved an architectonic study of the relationship between the researched materials and building element layering. In this context, students execute material hunting (selection) based on built examples in Detail Magazine, and these selected built examples were modeled as 3D tectonic digital models. (Figure 5). The objective was to provide information based on practical experience regarding the assembly-aware information of the materials and their alternative functions beyond their exterior cladding function. The students are expected to better understand the interrelationship between design and construction by experiencing the construction process in different design mediums.



(a) (b)

Figure 5: *3D Digital Tectonic Model Production.*
(a) Cork panel, (Student 1) (b) ETFE, (Student 3)

As a result of the research and studies conducted within the scope of the workshop, the following conclusions were listed.

- Theoretical explanations accelerated the experiential learning processes and supported the systematic material research process.
- The material hunt (selection) at the urban and campus scales did not meet the expected learning outcomes for all workshop participants due to the lack of some of the materials searched for. However, the material hunt (selection) through Detail magazine contributed more, allowing for analyzing tectonic relationships across scales through built examples.
- During the digital tectonic modeling process, most of the workshop participants had limited knowledge of using 3D digital modeling tools, which required the support of the instructors. For this reason, the participants could not experience the principles of construction and the inter-scalar design process at the targeted level. For this reason, a physical model study using realistic materials is thought to increase students' building knowledge and make experience-oriented learning processes more effective.

3.2. Main Study: Material !Ndeed 2

The second of the Material !ndeed workshop series was designed based on the pilot study results and was conducted with 14 students during the summer semester 22-23. Based on the pilot study's experiences, the workshop structure was improved by making the following modifications.

- Material hunting (selection) in the city and on campus was not included in the second workshop due to the inefficiencies identified during the pilot study.
- Generic layering exercise, 3d Digital models, and 1/10 scale physical building element models were included in the workshop's scope. Thus, the participants could experience the construction processes at different scales and the 3D digital tectonic model.

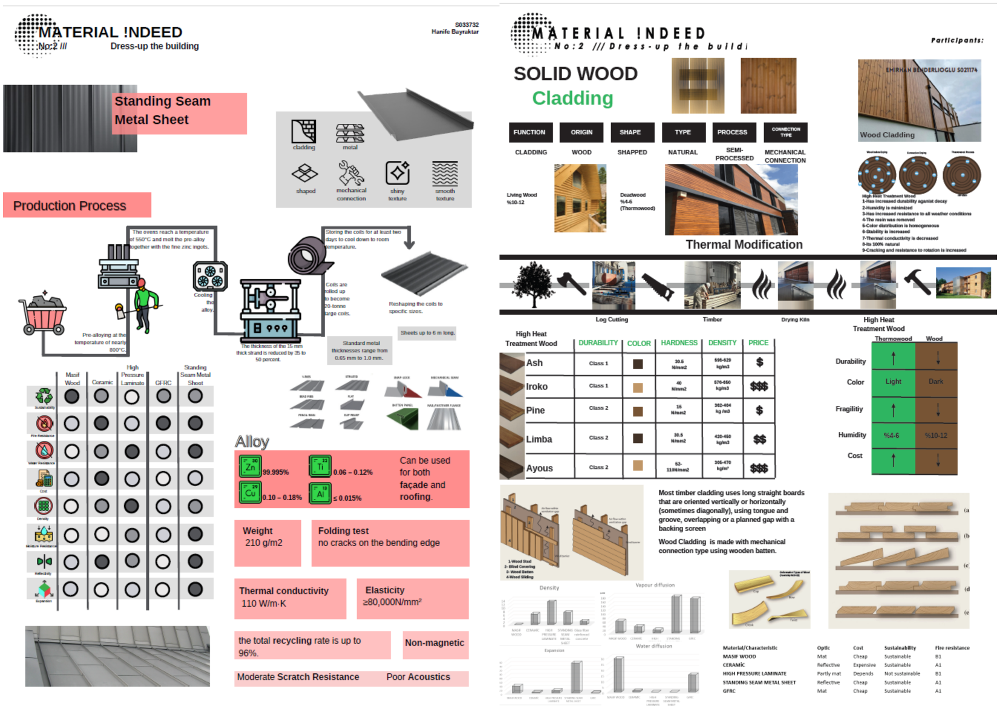
Based on the developments described above, the second workshop in the series focused on the generic layers that create the exterior wall, namely the core, insulation, and cladding materials. Thus, the architectural relationships between the material and the building element were considered holistically (Figure 1).

Following the introductory phase of the theoretical seminars, the materials were assigned to the students regarding material origin and function (i.e., core, insulation, cladding). In this context, assigned materials were analyzed according to their origin, such as mineral-based, terracotta, polymer, composite, metal, and wood-based materials. Besides, distinctive material properties were also investigated for better comprehension of material behavior. Afterward, all students continue with model production to execute hands-on building element design. This approach aimed to provide students with a comprehensive understanding of the tectonic design and construction processes, considering the material origins and functions. (Table 1).

Table 1: *Materials assigned to students in the workshop according to their origin and functions*

Assigned Material	Origin	Function
Glass Fiber Reinforced Concrete	Composite	Cladding
Standing Seam Metal Sheet	Metal	Cladding
Natural Wood Sliding	Wood	Cladding
Ceramic	Clay Based	Cladding
Compact Laminated Panel	Composite	Cladding
Perforated Brick	Clay Based	CORE (BONDED)

Aerated Concrete Block	Mineral Based	CORE (BONDED)
Steel Profile	Metal	CORE (SKELETON)
Natural Wood Stud	Wood	CORE (SKELETON)
Aluminum Sandwich Panel	Composite	CORE(PANEL)
Rock Wool/Glass Wool	Mineral Based	Thermal Insulation
EPS/XPS	Polymer	Thermal Insulation
Wood Wool	Composite	Thermal Insulation
Glass Foam	Glass	Thermal Insulation

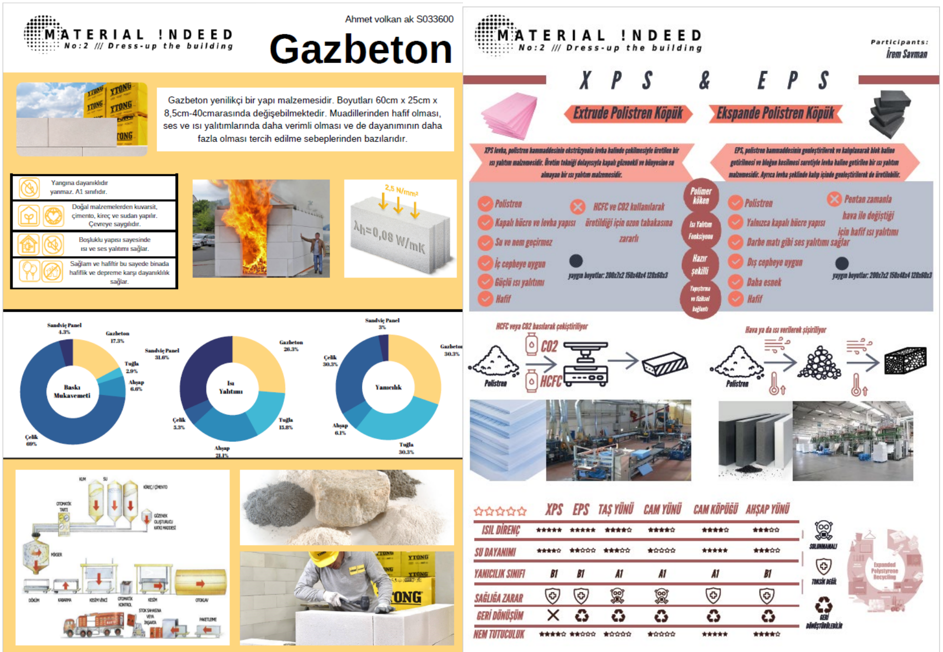


(a) (b)

Figure 6: *Building Materials Data Collection and Analysis Process (a) Standing seam metal plate, (Student 4) (b) Natural Wood Sliding, (Student 5).*

Students researched the properties and production processes of the material in Table 1 and analyzed the obtained data from the literature search using architectural representation tools (Figure 6 and Figure (7)).

Following the material analysis, the students conducted a material hunting (selection) in Detail Magazine. The students focused on selecting a built example of which their assigned materials were used. They examined the relationship between the material and other components in detailing scale according to 2D system sections and written information. They also discussed the relationship between material performance and building element performance within the scope of the workshop. Afterward, students produced three-dimensional digital models of exterior wall systems based on the



(a) (b)

Figure 7: *Data Collection and Analysis (a) Aerated concrete block, Student 7 (b) XPS/EPS, Student 8.*

(a) (b)

Figure 8: *Material hunting (selection) and 3D digital tectonic modeling in Detail Magazine (a) Natural wood sliding, (Student 5). (b) Rockwool, (Student 6), based on digital production.*

built examples selected from Detail Magazine (Figure 8).

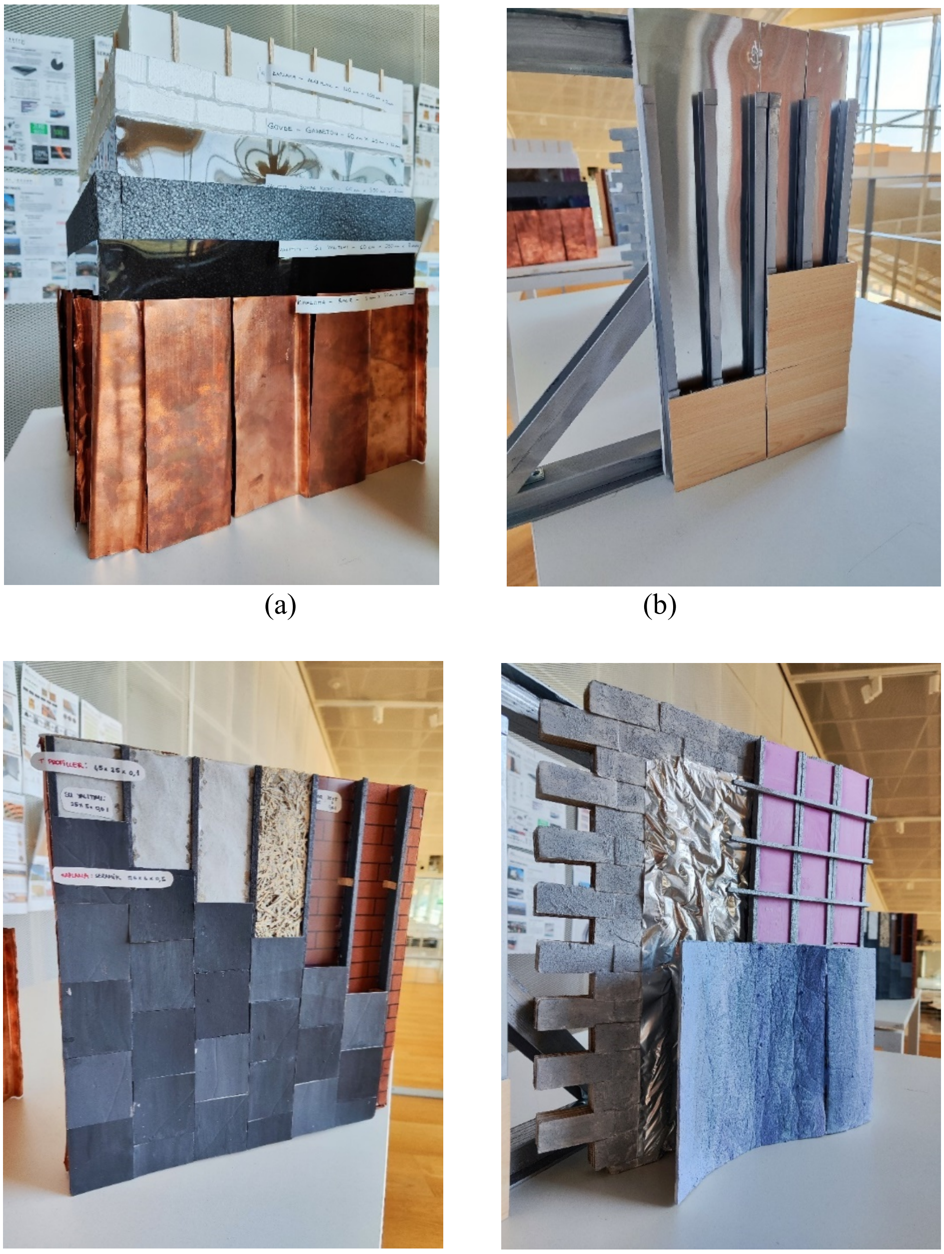
Following the digital tectonic modeling, the materials were allocated to the students according to their function and origin, and

Table 2: *Material Matching for Model Production Process*

Groups	**Coating**	**Body**	**Insulation**
Group 1	Standing Seam Metal Sheet	Aerated Concrete	Glass Foam
Group 2	Compact Laminate Panel	Steel Profile Sandwich Panel	*No additional insulation material is assigned since the sandwich panel contains an insulating layer.*
Group 3	Solid Wood Board	Solid Wood Strut	Rock Wool/Glass Wool
Group 4	Ceramic	Perforated Brick	Wood Wool
Group 5	Glass Fiber Doped Concrete	Aerated Concrete	XPS/EPS

working groups were formed for physical model production (Table 2).

According to research and analyses conducted in previous steps, students began to develop their own building element layering composition as a part of a tectonic design proposal based on selected built examples from Detail Magazine. The tectonic design proposal was executed considering principles of performance-based building element design. During the tectonic design process, the "reflective teaching/learning" approach developed by Schön for design education was preferred as the main educational approach (Schön, 1983). In this way, it aimed to enable students to produce creative solutions by utilizing the knowledge based on their experience gained in previous workshop phases. In this context, the design problem was defined as developing an exterior wall system that will meet the structural, thermal, water, moisture, sound, fire, and visual performances regarding Istanbul's climate. Although the properties of the materials meet some of these performances, substructure design and suggestions about additional insulation layers were expected to be determined by the students to ensure all performances. Furthermore, tectonic physical models were made with realistic materials. Thus, the structural performance of the proposed wall systems could be directly experienced, which refers to the learning-by-doing approach. In contrast, other performance requirements were reflected in the design proposals and model productions with respect to information gained from the theoretical seminars (Figure 9 and Figure 10).



(a) (b)

(c) (d)

Figure 9: *Tectonic model production on a 1/10 scale, (a) Group 1, (b) Group 2, (c) Group 4, (d) Group 5.*

The workshop concluded with a final jury to assess the entire process with the workshop participants. A survey was held to evaluate the students' experience of hyper-focused learning, including passive and active learning methods.

5. The Impact of the Hyperfocused Learning Approach on Material Selection and Tectonic Design Processes

A survey was conducted with 14 students who participated in the Material !ndeed 2 Workshop to determine the factors involved in the material selection process and its impact on architectural education. The results are evaluated below.

Considering the educational level of the participants, it is seen that 50% of the participants completed 1st grade, 35.7% 2nd grade, and 14.3% 3rd grade. Students currently in the 4th grade did not participate in the workshop.

- **From which sources do you use to select material in the architectural design process?**

The participants' most preferred sources for literature reviews and material research were websites with material catalogs, with a rate of 92%. Contrastingly, expert opinion was determined to be the least preferred source.

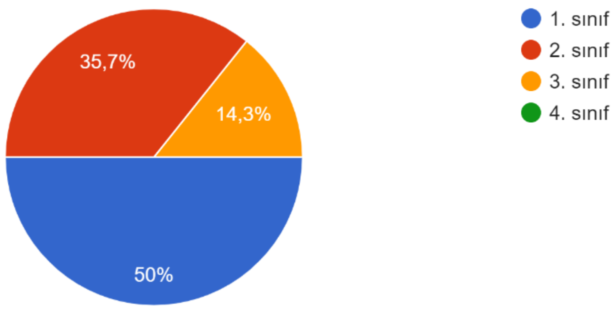


***Figure 10:** Questionnaire results*

The survey then continued with the following questions to understand the impact of the students' work on their material selection process. The survey questions were formulated by considering the workshop steps.

- **The factors that play a role in material selection are listed below. Please select the factors that you think you have information about.**

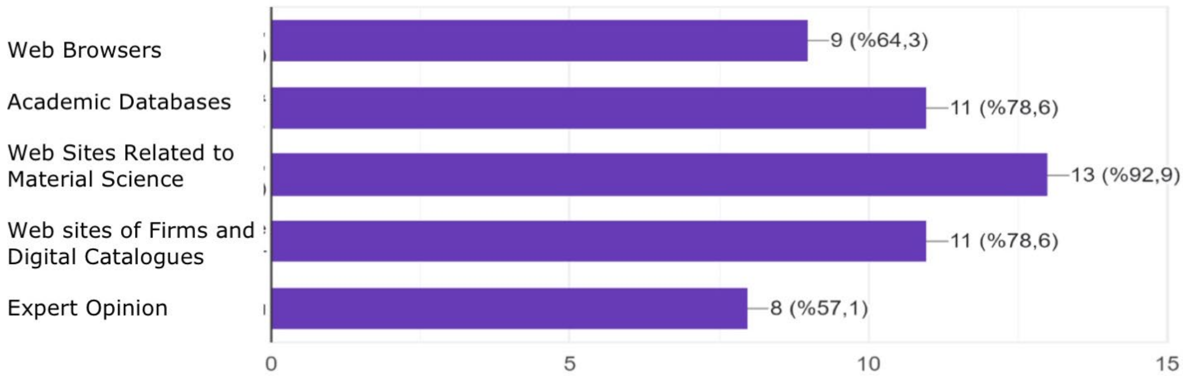


***Figure 11:** Questionnaire results*

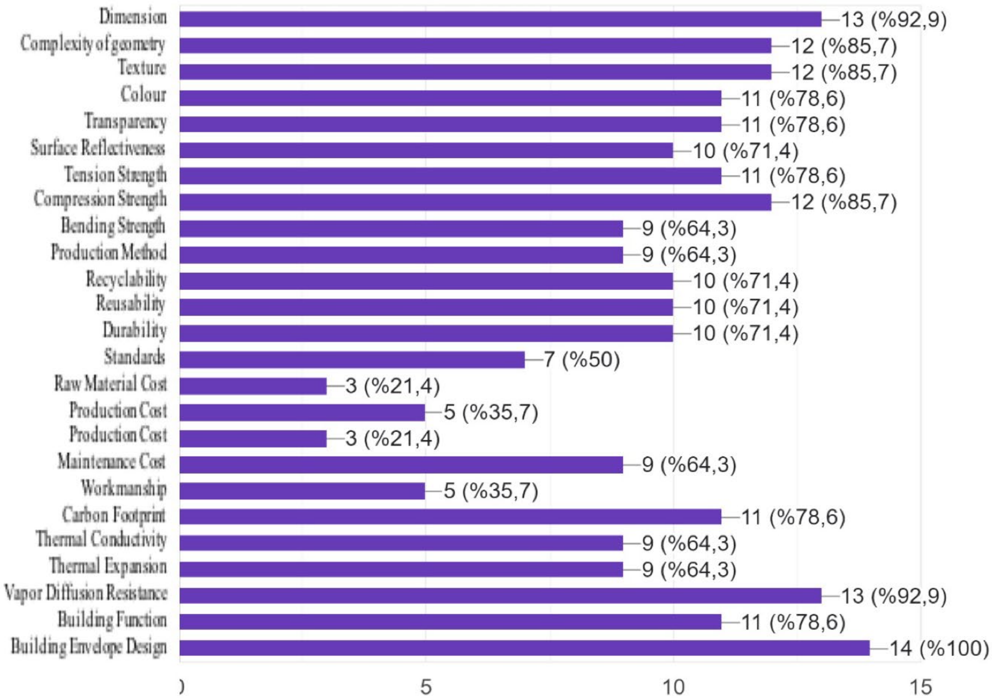


Figure 12: *Questionnaire results*

This question aims to assess the efficacy of the theoretical seminars. All participants indicated that they possessed knowledge of building envelope design, and 92% demonstrated familiarity with dimensional properties. The areas where the lowest proportion of participants reported confidence were raw material and maintenance costs, at 21%.

Please mark how much you agree with the following statements about the research internship (1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree)

- **Obtaining material samples and technical information from companies played an effective role in my understanding of the material.**

85% of the participants stated that providing samples played an effective role in understanding the material. 7% of the participants were undecided, while 7% thought providing samples was ineffective.

- **Physical contact with the material helped me to conduct my research effectively.**

85% of the participants stated that physical contact with the material helped their research process, while 7% were undecided.

- **The theoretical seminars presented by the instructors during the research internship were useful and supported my material research.**

92% of the participants stated that the theoretical seminars were useful, while 7% were undecided.

- **I can conduct a detailed literature search using scientific methods.**

92% of the participants stated they could conduct detailed research using scientific methods, while 7% were undecided.

- **I can interpret the data from this detailed literature research holistically.**

A total of 92% of the participants indicated that they were able to interpret the data holistically, while 7% of them expressed uncertainty about this proposition.

- **Because we summarize the data by visualizing it, I can interpret the data holistically.**

92% of the participants stated that visualization was effective in interpreting the data holistically, while 7% were undecided about the proposition.

- **I was able to interpret the data holistically because my groupmates and I analyzed the data comparatively.**

While 28% of the participants strongly agreed that the way to interpret data as a meaningful whole is to analyze data comparatively through group work, 35% disagreed with this statement, and 14% were undecided.

- **Making 3D digital models of built examples obtained from Detail Magazine played a role in my understanding of the relationships between materials, components, building elements, and buildings.**

While most participants stated that the sample projects effectively understood the relationships between materials, components, and building elements, 7% of students disagreed.

- **Making 3D physical models using our materials played a role in my understanding of the relationships between materials, components, building elements, and buildings.**

All participants indicated that the model-making process was an essential tool in enhancing understanding of the interrelationships between materials, components, and building elements.

- **Individual studies were quite instructive and beneficial for me.**
- **Group studies were quite instructive and beneficial for me.**

Regarding the instructiveness of individual and group work, 92% of the participants indicated that individual work was instructive and beneficial, whereas only 42% of the students stated group work to be useful.

- **The duration of the workshop was sufficient for the program.**

93% of the participants thought the workshop duration was compatible with the program. Additionally, all participants agreed that the workshop improved their competencies in understanding the relationships between design processes at different scales and between design and construction. In addition, the participants stated that the workshop allowed them to elaborate on the design proposals they developed.

- **I gained the foresight to select appropriate materials in the design process for my future architecture project courses through the experience I obtained during the workshop.**

While approximately 85% of the participants stated that the workshop gave them the foresight to select materials for their architectural design projects, 14% were undecided.

All in all, most of the students agreed that the workshop was highly productive, using passive and active learning methods with hyper-focused tasks. The students indicated they could easily transfer their theoretical knowledge into practical reasoning processes to achieve systematic material selection for performance-based tectonic design.

Discussion and Conclusion

The Material !ndeed Workshop series, which was conducted during the Summer Semesters 21-22 and 22-23 within the scope of Özyeğin University Faculty of Architecture Research Internships, aims to introduce scientific research methods to architecture students, as well as to provide them with the ability to make a systematic material selection and the competence to apply inter-scalar architectonic design approaches in design studios. In order to achieve the targeted learning outcomes, the workshop is designed with a hyper-focused hybrid educational approach that includes active and passive learning methods. The effectiveness of the proposed approach was evaluated through the outputs of the workshop participants and a questionnaire. Considering the evaluated results, possible contributions to architectural education and future studies on the subject were discussed, and the study's main results are explained below.

Hyper-focused learning is a very efficient approach to providing students with competence in technical subjects in architectural education, especially in materials science and building technology fields. The study shows that active and passive learning methods should be used together to increase the effectiveness of the hyper-focused learning approach in material selection and construction technology. The passive learning method is assumed to indirectly support students in executing effective material selections and transferring obtained information to architectonic design approaches in architectural design studios. Passive learning methods also enhance the efficiency of active learning processes by transferring substantial theoretical knowledge on scientific research methods and tools, architectural material properties and classification systematics, data representation, and analysis methods. However, it is essential that passive learning remains a complementary component that supports active learning instead of interrupting the design thinking process by overloading theoretical information to students that could not directly relate to the hands-on experience. To reduce the cognitive load on the student, passive learning inputs should be conveyed in a concentrated, context-based format focused on the study's specific outcome. Thus, it is thought that cognitive capacity can be reserved for the active and experiential learning process. To increase the efficiency of the experiential learning process, ill-defined design problems should be divided into well-defined sub-problems, and the sub-problem definitions should be elaborated and explicit. Thus, it is believed that the learning-by-doing process will progress much more adequately by leaving the creative production variables at the student's initiative during the experience. Compared to digital model production, architectonic model production is more suitable for establishing the relationships between material, component, and element concepts and understanding and applying performance-based building element design principles and construction methods and techniques.

In line with the results summarized above, it is believed that supporting building technology courses, which are a part of formal architectural education, with modules designed within the framework of a hyper-focused education approach, will increase the rate of experience-based knowledge acquisition of students and transfer their knowledge to architectural design studios much more successfully. In this context, the aim is to diversify this study in the future through hyper-oriented education modules focusing on different topics in building technology. It is also planned to expand the sample space by optimizing the executed questionnaire by applying it to more students and conducting a protocol analysis study with a certain number of workshop participants to analyze hyper-focused learning processes elaborately.

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