



## Learning and Evaluation in the Design Studio

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### Abstract

Kolb [1], argues that learning in the studio begins with experience, continues with reflection, and then becomes action in reflection, becoming a concrete experience. In the design studios, where the project-based learning model is adopted, students learn by discussing and talking with their peers and lecturers through criticism. Criticism, which is a systematic mechanism that gives regular feedback to students, is also an effective evaluation tool in the studio [2]. Many traditional forms of evaluation, including design project criteria, often test a limited range of skills, abilities, and knowledge and products rather than processes [3]. While a process-oriented learning is represented in the design studio, where learning by doing through projects and criticism and learning by reflection in action methods are applied, traditional studio evaluation can be more result-oriented. It is the learning objectives that need to be evaluated, and therefore evaluation methods should be compatible with these objectives [3]. According to Graham [4], an evaluation is summarizing the whole process and giving a grade to the student. In this context, the scope of this study is to discuss the qualities of a process-oriented evaluation that contributes to learning in the studio, where an increasing number of students participate day by day.

## 1. INTRODUCTION

The design studio is an organization where students gain professional knowledge and skills [5]. Design Studio organization differs from other disciplines in terms of the education method, model, and form [6]. Before moving on to professional life, students experience a real design process in the studio and learn to think as a designer in the face of a design problem [7]. Learning and applying the design process in the studio are intertwined [8, 9]. The design process is learned through the project through learning-by-doing methods. The workshops and computer stations in the studio also represent learning by doing.

The Design Studio is a learning environment organized to learning by doing and participate in reflective practice [10]. Student behaviors that take place after the communication of the student and the instructor in the studio represent learning with 'reflection in action' [8]. Interaction and mutual reflection activities between the instructor and the student create the experience of criticism in which learning takes place [5].

Criticism activity, which is at the center of the project process, is also called evaluation [7]. One of the challenges of the studio is its ability to create a meaningful environment that allows equal access for criticism as an evaluation tool, which has an important role in learning in the design studio, where increasingly larger groups of students participate [11]. Another difficulty is that the focus of criticism, which is an evaluation tool, focused on the final product and presentations rather than the process. The focus of critical evaluations should move away from the product and approach the process and learning of the students [12]. Design, which was redefined by WDO in 2015, is positioned as a process-oriented discipline and the course hours and credit intensity of the design studio also represent process-oriented learning [13]. Students expect an evaluation to be able to explain what the goals it needs to achieve, what is expected in its work, and what needs attention. Therefore, evaluation is not only an additional testing activity but also a part of the learning experience [14].

An evaluation method specific to design education is an important part of the learning process [15]. While some studies are being carried out in the field of evaluation in design disciplines, a study that has made the evaluation criteria clearer has not yet been revealed [16]. Instead of non-dynamic, rigid, and prescriptive criteria, criteria that allow differences should be determined [17]. The scope of this study is to explore the qualities of an evaluation that can help student learning in the studio.

## 2. EVALUATION IN DESIGN STUDIO

### 2.1. Design Studio

The fact that the Design Studio is still the center of design education has historical roots in models such as the Ecole Des Beaux Arts (1819-1914) and the Bauhaus (1919-1932) [18]. The studio has been the main course of design education since the mid-1940s [19]. All courses taught in design education serve the Design Studio course, which has the highest number of hours and credits [12, 15, 20, 21].

The ECTS distributions of the Design Studio course by semesters in state universities with a four-year Industrial Design Department in Turkey are shown in Table 1, and weekly course hours are shown in Table 2. According to Table 1, approximately one-third of the 240 ECTS, which is the graduation requirement of the student, consists of the Design Studio course. The Design Studio course is carried out 1 or 2 days a week, according to the hour density determined in the universities indicated in Table 2. Design studio course hours and credit intensity represent that the course is taught with a process-oriented approach [13]. The universities in the Tables are listed according to their departmental success score and the data are taken from the websites of the universities. The Basic Design course, which is the main course of the first and second semesters, is carried out as a studio course, although the name and learning outcomes are different from the Design Studio course. For this reason, the Basic Design course is also included in the comments. In this study, this course is referred to as Design Studio and Studio.

**Table 1.** ECTS Distribution of the Design Studio Course by Term

	ECTS Distribution of Course by Term								
	1st	2nd	3rd	4th	5th	6th	7th	8th	% of 240 ECTS
Middle East Technical University	9	9	9	9	9	9	14	14	34,17
Istanbul Technical University	8	8	8	9	9	9	9	15	31,25
Mimar Sinan University	6	6	11	11	12	12	12	15	35,42
Marmara University	5	5	11	11	10	10	10	16	32,50
İzmir Institute of Technology	10	10	8	8	8	8	8	10	29,17
Eskişehir Technical University	12	11	12	12	12	12	12	14	40,42
Gazi University	10	10	10	10	10	11	11	19	37,92
19 Mayıs University	7	7	10	10	10	12	10	10	31,67
Selçuk University	10	8	10	10	10	10	10	11	32,92
Karabük University	10	10	10	10	10	10	10	10	33,33
Bilecik University	9	9	6	6	6	8	10	15	28,75

**Table 2.** Weekly Class Hour Distribution of Design Studio Class by Semesters

	Weekly Course Hours by Term							
	1st	2nd	3rd	4th	5th	6th	7th	8th
Middle East Technical University	12	12	12	12	12	12	12	12
Istanbul Technical University	8	8	8	8	8	8	8	8
Mimar Sinan University	8	8	12	12	12	12	12	15
Marmara University	5	5	8	8	8	8	10	10
İzmir Institute of Technology	8	8	8	8	8	8	8	8
Eskişehir Technical University	9	9	12	12	12	12	12	9
Gazi University	8	8	8	8	8	8	8	8
19 Mayıs University	6	6	6	6	6	6	6	6
Selçuk University	8	8	8	8	8	8	8	8
Karabük University	8	8	8	8	8	8	8	8
Bilecik University	8	8	6	6	6	6	10	10

## 2.2. Learning at Design Studio

Maitland [22] argues that the Design Studio is a way of thinking and learning. Design Studio, which is a learning center in professional design education [12, 13, 21], expresses a classroom-type and a specific physical environment and carries a specific learning philosophy depending on the curriculum [23]. Traditionally, 'designer thinking' is learned in the studio [24].

Schön [8] observed that learning in the design studio, which starts with ill-defined problems, which is a characteristic feature of professional education, takes place through a process he calls 'reflection-in-action'. Design is learned through a kind of 'master-apprentice relationship' in studio classes where mutual reflection activities are carried out or, in educational terms, 'learning by doing' [25]. Design Studio is a learning environment where participating in reflective practice and learning by doing takes place [10].

The 'learning by doing' model in the design studio is based on Kolb's Experiential Learning Theory. Kolb [1] defines learning as a four-stage cyclical process. It is accepted as a cycle that starts learning with experience, continues with reflection, and then leads to action, which becomes a concrete experience for reflection [12]. Thus, this process continues as a cycle, new experiences are gained and these experiences play a leading role in further learning [1, 26]. In this cycle, the most effective learning takes place through self-reflection [27, 28].

### 2.2.1. Design Studio Organization and The Learning

The Design Studio, the focus of Industrial Design education, is an academic, social and physical organization. Basically, the Design Studio is defined as a well-planned, education teaching space where students are assigned specific tasks and projects to implement individually or in groups, and where students carry out their solutions or design processes together with peer students and instructors [6].

The Design Studio organization consists of instructors, students, peers, the physical environment, and physical equipment stakeholders. In the Design Studio, instructors aim to coach students to think broadly and deeply through discussion, assumption, and imagination [7]. This relationship between student and academic is often referred to as the master-apprentice relationship, by the model in which learning is inextricably linked to practice [25, 29].

Bringing students and instructors together during class hours and students with their peers outside of class hours, the studio is a social learning environment for students [21] where there is both friendship and cooperation with their peers. Student-to-student learning and interaction also occur in the presence and absence of the instructor [30].

The studio, where students are allowed to work on projects individually or in groups, is a large room mostly composed of drawing desks and chairs and is different from traditional classrooms [7, 31]. Sometimes woodworking, metalworking workshops or computer stations are used as an extension of the studio, while sometimes these equipment can be found inside the studio. This feature of the studio embraces the concept of learning by doing and gives students the opportunity to examine concrete aspects such as form and texture. The importance of physical models in learning industrial design cannot be ignored [31].

Since the physical environment serves the communication and cooperation between student-student, student-instructor during the course of the course, it can be said that the Design Studio is often referred to as a physical organization when defining it. On the other hand, although in recent years, some schools and programs offer virtual studios or environments where students learn and are criticized through information sharing over the internet [23], virtual studios in design education are a matter of debate.

### **2.2.2. Project Based Learning in the Design Studio**

The Design Studio learning strategy in architecture and design education is a “project” that includes a semi-structured experiential learning model [32]. In the studio, a product is designed by the students in a process and completed within a period of time [5]. Project-Based Learning [33], which takes place while solving a project-specific problem, emphasizes the learner's process [34]. Unlike traditional classroom assignments, the Studio project is based not only on the final "product" of a student's work but also on the visible process that the student takes to reach the final product [23].

In the project-based Design Studio, learning by doing methods are developed [7]. While learning in the design studio, takes place in a project-based process, existing theoretical knowledge and practical skills are used and new knowledge and skills are acquired. This teaching strategy has been widely accepted and implemented since the 1950s [19].

At the beginning of each academic year, studio trainers come together and decide the project topics to be worked on during the semester. Students are presented with a design summary stating the project topic, project goals, expectations from them, how the process will work, and time planning. Students can work (a) completely independently, (b) partially independently in groups or teams, or (c) completely in groups or teams [23]. Throughout the project, the communication between the student-instructor-peer takes place around a desk or on the studio wall in the studio in the form of discussion and conversation through drawings and models. The Design Studio course is handled by the trainer or trainers, by criticizing and evaluating the projects one by one. Students experience this process under the supervision, review, and guidance of at least one instructor [31]. During the project period, an interim jury is held once or twice according to the preferences of the studio coordinators, and the projects are presented to the jury members by the students on the date of the interim jury. Students present the final version of their projects to the members of the jury consisting of trainers and professionals through oral presentations, posters and models on the date of the jury. The oral, written and visual materials used throughout this project process, the way the course works, the physical equipment of the studio, the communication, interaction and criticism between the student-instructor and peers form the studio culture.

### **2.2.3. Criticism in the Design Studio and The Learning**

The Design Studio is both a learning center and a complex social interaction like any other learning environment. Among the types of interaction (written, verbal, visual) that take place between stakeholders in the design studio, verbal interaction is the most effective. Ashton [35] argues that verbal interaction between student and instructor is crucial to students' learning experience. Mutual reflection activities, in which the student reflects the action of the instructor and the instructor reflects the action of the student, create the experience of criticism in which learning takes place [12]. This type of critical activity is

highlighted in Donald Schön's *The Reflective Practitioner* [8] and is summarized as a close, often patriarchal relationship between an instructor and a student [36, 37].

Criticism in the design studio is the learning method in which the student's design works are examined by the studio course instructors in various parameters. While in many other courses in design education and other disciplines, students' status is observed through homework, tests and exams at certain times, while in the studio, students' status is observed with desk critiques [23].

There are variations of critique in the design studio that an instructor uses to communicate with students. Utaberta et al. [38] categorized the criticisms as lecture criticism and jury criticism. Bailey [39] classifies the types of criticism according to the physical features and the way of critique transfer and describe desk crit, group crit, interim jury, final jury, and informal crit as. While desk crit takes place one-on-one between the instructor and the student, group crit is a type of critique where more students come together and allow students to listen to and criticize each other's criticism. An interim jury is a form of criticism that the student receives in his presentations to the whole class when the instructor wants students to benefit from each other's processes and knowledge. The final jury is the criticism received from all jury members when the projects are completed. The difference between interim and final juries and desk and group criticism is that it is a session where the student faces a panel of judges [40]. Informal criticism is the type of criticism that students receive indirectly from each other or their peers outside the studio when the instructor is not in the studio. It can be mentioned that the online critical approach has also become widespread because the courses are started to be taught widely through online platforms with Covid-19. While online room crit is similar to desk and group crit in terms of the purpose of the criticism, it is carried out with the whole class as in the interim and final jury. Being able to watch the recordings later by students with online crit is an innovation as well as an activity that reinforces education [41].

The critique activity encourages students to develop their reflective action skills and to question the design processes, decisions and results [11]. Students share information with each other and with the instructors during the processes of working, presenting, and receiving feedback on their projects in lectures and juries, and learn from critical evaluations about their strengths and weaknesses [42].

### **2.3. Evaluation in the Design Studio**

One of the main features of the studio is that the evaluation of student success, knowledge and skills is done indirectly, that is, through practices and projects, instead of traditional exams, and the form of evaluation is examination and criticism [43]. The Design Studio is an iterative process in which instructors and students are in constant interaction, and solution proposals are evaluated and developed for the solution of a design problem, resulting in the evaluation of design proposals by a jury of instructors.

Jury crit is used as an evaluation tool in design education [44]. Desk criticism is also used as an evaluation tool [43]. Desk crit serves to learn as it is a formative evaluation, while jury crit serves to assessment because it is a summative evaluation [45].

Summative evaluation, which have the feature of assessment, are used to give a course grade to students, and are called evaluation of learning [46]. Formative assessment, in other words, with assessment for learning, learning continues, it provides feedback to the student about their competencies, and is not used for grading [46]. The summative feature of the criticisms made in the interim and final jury is more than the criticisms made during the design process. Criticism, which is used both as a regular feedback method and an effective formative evaluation tool by instructors and peers in design studios, is the backbone of the education process [2, 28, 40].

Broadfoot and Bennett [18] recommend a process-oriented studio and evaluation with less emphasis on final product evaluation for training an effective design studio. Evaluation in the design studio should summarize the whole process and end with giving a grade to the student.

#### **2.3.1. Evaluation Studies in the Design Studio**

In a study conducted by Utaberta and Hassanpour [47], it was stated that the evaluation of projects with a holistic approach prevented students from being aware of their weaknesses and strengths. For this reason,

it was stated that the students did not make more effort to increase their grades. It has been revealed that students who are masters in graphic design and visual presentation are likely to influence instructors in the presentation of the final product. In the study, it was stated that instructors could make the mistake of evaluating students with a non-objective comparison method. In the study, since learning was defined as an ongoing process, evaluation scales such as yes or no, one or zero were not found positive.

Ragheb [48] conducted a study on how to evaluate first year students of Pharos University Department of Architecture. In the study, it was concluded that the application of a well-designed criterion-based evaluation together with the criticism in the learning process of the student will contribute greatly to the student's learning. It has been argued that criterion-based evaluation is an important part of continuous learning, as it provides the instructors with data on how far students have progressed and how they can improve. It was concluded that the students were satisfied with the evaluation method defined as criterion-based evaluation and it helped their self-evaluation.

Utaberta et al. [38] concluded in a study that 86% of architecture students stated that evaluation criteria would help their learning. Kulkani and Klemmer [49] concluded that graded evaluation contributes to students' self-evaluation as a result of their study with industrial design students, and they advocated the view that it should clearly explain goals and expectations. In a study by Utaberta et al. [38] on evaluation in architectural design studios, it was stated that the expectations of the students were mostly met in the desk crit. It has been concluded that criteria-based evaluation can be useful in helping students have more ideas and control about themselves, their learning, and thus more self-control.

Çıkış and Çil [43] discussed how students are evaluated in the basic design course of Izmir University of Technology, Department of Architecture, and ways to evaluate the design and performance of students in studios by asking questions to the instructors. Therefore, the study dealt with the subject from the perspective of instructors. The results revealed that the majority of the participants approached a criteria-based evaluation that is updated every semester positively. Results indicated that the primary focus of evaluation was always studio production (final products of students). During the evaluations, it was concluded that students tend to neglect the experience and learning process. It has been stated that instructors generally consider models and two-dimensional drawings in the final product evaluation. It was concluded that research presentation and other presentation contents such as posters were taken into consideration less.

**Table 3:** The most common learning outcomes in Design Literature [16]

	Arch (n=54)	Art (n=24)	Design (n=40)
Product	1	5	6
Process	2	1	1
Soft skills	3	3	3
Hard skills	4	2	2
Learning approach/style	5	9	5
Prof & innov practice	6	6	4
Content knowledge	7	7	7
Technology	8	6	8
Reflective practice	9	9	9
Interdisciplinary collab	10	9	11
Person	11	4	10
Participation	12	12	12

De La Harpe et al. [50], analyzed the focus of 118 journal article abstracts in the fields of architecture, art, and design published over the past 10 years. With this study, evaluation in the studio as 11 basic indicators for their titles; product, process, person, basic skills, social skills, content knowledge, technology, learning approach/style, professional and innovative practice, reflective practice, and interdisciplinary collaboration were determined. When Table 3 is examined, process, hard skills, and soft skills take the first and third place as the focus of the studies in the field of design. According to the study, the most frequently addressed learning outcome in design education is the process.

According to these studies, it can be said that there is a need for a process-oriented evaluation that encourages learning, provides feedback on learning, grades learning, and creates preliminary information for further learning.

### 3. CONCLUSION

Although evaluation is not the only component of learning, it does affect learning. An evaluation provides students with self-evaluation and awareness of their learning. In terms of educational institutions and instructors, an evaluation ensures that the student has an idea about their previous and next learning, continuity in learning and monitoring. Thus, evaluation becomes more important than a score and becomes a factor influencing learning [38]. According to these studies, it can be said that there is a need for a process-oriented evaluation that encourages learning, provides feedback on learning, grades learning, and creates preliminary information for further learning.

Straková [51] states that students think that they do not get the grade they expect despite fulfilling all the demands of the instructor and that they interpret the instructor' evaluation unfairly. Students expect a more clear, understandable and instructive evaluation. Transferring the positive and negative aspects of students to them will contribute to their further learning. Evaluation of students with only one score is not enough for them to improve themselves [52]. Instructors, on the other hand, state that they are concerned about whether they can objectively rated the progress and achievements of students while making evaluations.

One of the most frequently mentioned problems in design education is that studio evaluation focuses on the final product rather than the process [53]. Many traditional forms of evaluation, including design project criteria, often test a limited range of skills, abilities, and knowledge and products rather than processes [3]. Evaluation should be more widely integrated into the unit's activities and learning tasks and the development processes of students' learning [54]. Lindström [55] argues that a criterion-referenced evaluation applied to students by instructors can draw attention to the procedural dimensions of creative work and explain tacit knowledge. It is necessary to focus and evaluate all aspects of design, including product, process and person [50]. Biggs [56] states that when the curriculum and evaluation methods are compatible, the results of performances are greatly enhanced. It is the learning objectives that need to be evaluated, and therefore evaluation methods should be compatible with these objectives [3].

Despite all these problems, evaluation is a neglected field of design education [16]. Considering the evaluation difficulties in the increasing studio population, it is necessary to develop formative and summative new evaluation methods that are process-oriented and contribute to learning.

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