

## Changing Paradigms, Subjects, and Approaches in Industrial Design Studio Education in Turkey\*

Türkiye’de Endüstriyel Tasarım Stüdyo Eğitiminde Konu ve Yaklaşım Odaklı Değişimler

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**Abstract.** Boundaries of industrial design discipline are expanding rapidly through new concepts that have emerged in recent years such as service design, experience design, sustainability, and social design. Additionally, the new approaches featuring co-design as collaboration and interdisciplinary approaches have started to take part in the agenda of design. In the framework of these developments, this study aims to discover subject and approach centered changes in industrial design studio education over the last twenty years. Accordingly, the compulsory design studio course, which is considered as the cornerstone of industrial design education, was defined as the research field and the semi-structured interview technique as a qualitative research method was used. As a result of the interviews carried out with the design educators, this research revealed the subject and approach oriented practices in industrial design studio courses within the context of changing interest areas of the design discipline.

**Keywords:** Industrial design, Design education, Design studio, Design project topics

**Öz.** Endüstriyel tasarım disiplinin sınırları son yıllarda ortaya çıkan hizmet tasarımı, deneyim tasarımı, sürdürülebilirlik için tasarım ve toplumsal tasarım gibi yeni kavramlar aracılığı ile hızla genişlemektedir. Ayrıca, birlikte tasarlamayı ön plana çıkaran iş birliği ve disiplinler arası gibi yaklaşımlar tasarım alanının gündeminde yer almaya başlamıştır. Alandaki gelişmeler çerçevesinde, bu çalışma endüstriyel tasarım stüdyo eğitiminde son yirmi yıl içinde gerçekleşmiş olan konu ve yaklaşım odaklı değişimleri keşfetmeyi amaçlamaktadır. Bu doğrultuda endüstriyel tasarım eğitiminin temel taşı olarak tanımlanan zorunlu tasarım stüdyosu/proje dersi araştırma alanı olarak belirlenmiş ve verilerin toplanması için nitel araştırma yöntemlerinden yarı yapılandırılmış görüşme tekniği kullanılmıştır. Eğitimciler ile gerçekleştirilen görüşmelerin sonucunda, bu araştırma tasarım disiplininin değişen ilgi alanları bağlamında endüstriyel tasarım stüdyosu derslerindeki konu ve yaklaşım odaklı uygulamaları açığa çıkarmıştır.

**Anahtar Kelimeler:** Endüstriyel tasarım, Tasarım eğitimi, Tasarım stüdyosu, Proje konuları

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## Introduction

A design studio course is situated at the center of industrial design education providing the main learning and teaching environment. Also, it is a place of simulation of the profession by presenting different conditions to the students to act in as many different roles as possible that they are likely to meet after graduation. In the meantime, the scope of industrial design has extended significantly in recent years and the issues currently appearing on the design field have also started to affect industrial design studios.

At their 29<sup>th</sup> general assembly in 2015, International Council of Societies of Industrial Design (ICSID), which also accordingly changed its name to World Design Organization, declared a renewed definition of industrial design. The new industrial design definition verified the expanding scope of discipline with its new promise of “design for a better world” as follows:

Industrial Design is a strategic problem-solving process that drives innovation, builds business success, and leads to a better quality of life through innovative products, systems, services, and experiences. Industrial Design bridges the gap between what is and what’s possible. It is a trans-disciplinary profession that harnesses creativity to resolve problems and co-create solutions with the intent of making a product, system, service, experience or a business, better (WDO, n.d).

As it can be seen from the definition, industrial design has started to elaborate its main focus from designing pleasurable mass-produced products to designing solutions for more complex problems, even some of which have no single product deliverable as ending up with designed experiences. Moreover, with putting forward the “trans-disciplinary” aspect of design practice, co-creation (creating with others) of the solutions has been highlighted throughout the design process.

At the beginning of the twenty-first century, Buchanan (2001b) suggested “four orders of design” as the “places” to discover and understand the changing nature of the design. First and second orders named as “symbols” and “things” represent the concerns on which graphic design (symbols) and industrial design (things) are based. Besides focusing on symbols and things, the third order of design “action” provides a place to create new products considering the value of design and covers “interaction design” with experiences, products or services (Buchanan, 2001b). Lastly and more comprehensively, Buchanan’s fourth order “thought” focuses on organizing a system or an environment. Therefore, a new era for designers, educators and researchers started with his words “We are now in the early formative stage of understanding how third and fourth order design will transform the design professions and design education, but the beginning has been made” (Buchanan, 2001b, p.12). Even though Buchanan’s article was written nineteen years ago, four orders of design framework still keep up to date and third and fourth orders of design have been transforming design area from practice to education as he told. Recognizing Buchanan’s orders of design, Jones and van Patter (2009) propose four design domains in terms of design processes required to encounter an increasing complexity:

- 1. Artifacts and communications:** design as making, or traditional design practice
- 2. Products and services:** design for value creation (including service design, product innovation, multichannel, and user experience), design as integrating
- 3. Organizational transformation** (complex, bounded by business or strategy): change-oriented, design of work practices, strategies and organizational structures
- 4. Social transformation** (complex, unbounded): design for complex societal situations, social systems, policy-making, and community design (as cited in Jones, 2014, p. 98).

Although four domains necessitate different skills and methods including different stages of collaboration and participation of stakeholders to cope with increased complexity, they are closely related to each other in practice (Jones, 2014).

Whereas the complexity of the problems has increased tremendously, design has begun to be embedded more into society and also other disciplines' agenda. Moreover, design has created new domains for designers and a variety of areas such as interaction design, service design, experience design, sustainable design, and social design have started to emerge. These developments have also made design create new possibilities for people from different backgrounds to come together and collaborate in multidisciplinary design teams (Inns, 2007).

Interaction Design is a highly effective field, with which industrial design discipline is in close contact during the design process of interaction and communication technologies embedded products. Interaction design was first introduced in 1984 as a new discipline (Moggridge, 2007). Though, it started to become more popular in the agenda of industrial design at the beginnings of the century, because of the increasing importance of aesthetic properties of use and the experience of users, beyond the usability and performance that engineers deal with (Lowgren, 2013). Moreover, evolved from human-computer interaction (Carroll, 1997) a new term user experience (UX), which was popularized by Donald Norman (Norman, Miller, & Henderson, 1995), refers to the whole experience that user lives by interacting with design through an interface. Kaptelinin and Hassenzahl (2013) describe UX design as "a sub-category of" experience design and distinguish it consciously as the creation of experiences through not only interactive products but also other mediums. Likewise, addressing the issue of interaction design from a broader perspective, Kolko (2007) defines interaction design as the process to create a communication between a human/user and the product, system, or service. This human-artifact interaction may be applicable not only to digital device but also to a sales process or a whole conference (Knemeyer & Svoboda, 2006). Hence, interaction design is linked with Buchanan's third order of design (action) in substance, as it was mentioned before (Buchanan, 2001b).

In 2002, Morelli was the first amongst design researchers to present the role of designers on developing creative Product-service systems (PSS), which was defined as "a marketable set of products and services capable of jointly fulfilling a user's need" (Goedkoop et al., 1999) from the marketing perspective. He further explained that special methodological tools were required for the design process of PSS beyond traditional design methods (Morelli, 2002). Tukker and Tischner (2006) defined PSS as "a mix of tangible products and intangible services designed and combined so that they jointly are capable of fulfilling final customer needs"(p.1552). Service design, as the intangible part of PSS, arose with the growth of "service economy" in developed countries. In 2005, Moritz noted that "service design is a new field in which user-oriented strategies and concepts are designed to make services better for an organization and their clients" (p.13). As companies have started to provide value to the customers through services and the products have become platforms for services, adaptation to this new paradigm has been unavoidable for product designers. The first international service design conference "Emergence 2006", which was held by Evenson and Mager at Carnegie Mellon's School of Design in 2006, highlighted and raised concern over service design (Brandenburg, 2018). From a holistic perspective, service design encloses designing interactions, experiences, and relationships (Meroni & Sangiorgi, 2011). According to Morelli (2009), two different areas affect service design; while the first is related to engineering and business sciences, the second is related to interaction design. A variety of technological advancements such as the Internet, computers,

wireless appliances, and telecommunication technologies have enabled service design (Moritz, 2005), and strengthened the interaction dimension of services with new possibilities.

Although the environmental and social concerns have newly started to attract designers' attention, it is not a new paradigm. In his book "Design for the real world", Victor Papanek (1972) criticized the function of design supporting the consumption, but instead, he redefined the design's function as solving the real social problems of humans. Since that time, the design has started to be seen and used as an essential tool for finding creative solutions to socially and environmentally tackling problems and even contributing to social and economic improvements of developing countries. The environmental context of design has covered different terms from the beginning. Bhamra, Lofthouse, and Cooper (2007) explain the periods of changes in their book as green design, eco-design, and eventually sustainable design which contains green design and eco-design as well. Eco-design is described as designing a product (which basically takes into account economic, functional, aesthetic, and safety dimensions) with added environmental dimensions to be considered (Tischner & Charter, 2001). On the other hand, sustainable design goes beyond the ecological dimension by developing ecological, economic, and cultural environments that can promote sustained social well being (Bhamra et al., 2007).

In 2006, RED Group of British Design Council launched the concept of "transformation design" with RED Paper 02, which can be defined as the first essay to establish a connection between design and social innovation (Burns et al., 2006). Designers who are interested in dealing with complex problems with a purpose of transformation should be able "to think systemically, apply design thinking in broader social, economic, and political contexts, collaborate fruitfully with other disciplines, and champion a human-centered design approach at the highest levels." (Burns et al., 2006, p. 206). Additionally, designers who are likely to play the role of social actors instead of creators of abundant products can facilitate the design process by using design tools with the help of a participatory approach (Manzini & Rizzo, 2011). The social issues of design can be encountered in the literature and the practice named such as socially responsible design (Davey et al., 2005), social design (Armstrong et al., 2014), design for social innovation (Manzini, 2015; Morelli, 2007), and design activism (Fuad-Luke, 2009).

Designing and being a designer in the twenty-first century is the main research focus of many design researchers who try to adapt to the changing nature of design by describing new roles for designers. As Sanders and Stappers assert (2008), newly developing design landscapes will transform what is designed, how it is designed, and who designs it. Many researchers have dealt with the changing designer skills in the post-industrial design world based on the need for interdisciplinary collaborative working in addition to the traditional designers' skills (Beucker, 2004; Yang, You, & Chen, 2005). Moreover, Norman (2010) issued a call for a change to design educators by explaining new skills that designers need to gain to work with social and political problems that are complex. Accordingly, adopting a human-centered approach has been presented as a solution for the shift "from the traditional, product-oriented design process to a process for designing solutions to complex and often intractable social, environmental, and even political problems" (Manzini, 2016, p.53). Both solution centered design process of tackling problems and design process of complex services or systems require collaborative design activities that involve a variety of stakeholders as other disciplines, experts, authorities, and also users. Co-design (Fuad-Luke, 2009; Sanders & Stappers, 2008), which is generally connected with participatory design, questions the role that users play throughout the design process and encourages users to co-create new products/services as "experts of their experiences" (Sleeswijk

Visser et al., 2005).

The design studio is “at the heart of most industrial design curricula and is a place where students learn to visualize and represent aspects of a problem graphically and to think as a designer” (Green & Bonollo, 2003, p.269). In addition to this, the design studio as an application of the constructivist education paradigm makes collective learning culture possible through the dialogue and interactive environment created between a student and an educator (Aydınlı, 2015). In the process of constructing knowledge, “learning by doing” (Dewey, 1980) can be seen as a kind of “learning to learn” paradigm in a studio setting on which design education is based. Moreover, “reflection-in-action” (Schön, 1984) which is founded on the discipline of architecture remains applicable in industrial design studios aiming to train junior designers with the help of seriously planned reflective progress. There are several studies in the literature of design pedagogy in response to what type of learning takes place in studio education presenting problem-based learning, project-based learning, and experiential learning. Green and Bonollo (2003) explain the difference of project-based learning from problem-based learning, with its contribution to students’ learning not only waiting from them solutions to a given problem with the help of settled fundamentals but also giving them a chance to discover the problem. While the problem’s scope is getting more complicated in parallel with the increasing complexity of design areas, the question of how the project subjects and design approaches studied in design studios are affected is missing. According to Buchanan (2001a), the aim of design education is to create a designer who has enough knowledge about the design processes and in addition to this who has a broader perspective that is needed in the complex conditions most likely to exist in the future. Hence, research was based on a personal belief that a design studio course can be the most flexible course in the curriculum where rapid changes affecting design can be implemented easily due to facilitating project-based learning.

### **Methodology**

This research aims to explore changing paradigms and related subjects given as project topics in compulsory design studios through the changes in the design discipline. In the study, it is also planned to seek to reveal new approaches applied in design studios. So, to discover what is going on behind the closed doors of studios by searching for the reflections of the changes in the broadening area of design, it was decided to draw from the holistic view of qualitative research methods. Qualitative methods offer an effective way of constructing common themes after analyzing data and reaching meaningful results with the help of the researcher’s interpretations (Creswell, 2009). To gain insights into the subject-oriented and approach-oriented changes semi-structured interviews were conducted with 22 design studio lecturers who are the main coordinators of design studios. Within this scope, the following questions were answered:

1. What are the changing paradigms of design project subjects in design studio education?
2. What are the design approaches recently emphasized in design studios?

### **Participant Selection**

Participant selection was made according to the purposeful sampling method (Patton, 2002), which includes defining and choosing a group of people who have special knowledge about the



fact being researched. During the sample selection, researchers can create their own criteria or criteria list prepared by other researchers before (Yıldırım & Şimşek, 2008). Since the aim of the research is to understand the changes in the studio education from the perspective of the educators, criteria for identifying the participant group were as follows: teaching one of the compulsory design studio courses and having an experience of at least five years in studio education to identify the changes. Therefore, academic people in industrial design departments in Turkey were listed and then they were sent e-mails informing about the study and asking for their participation. The educators who were interested in the research subject and accepted to involve were interviewed. “Bernard (2002) and Spradley (1979) note the importance of availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner” (as cited in Palinkas et al., 2015, p. 534). In this study, the research sample includes 22 participants whose academic titles and academic experiences in the design studio presented in Table 1. To be able to keep the research confidential, the names of the interviewees were changed with numeric code names given randomly.

**Table 1.**

*Properties of Participants*

Participants	Academic Title	Experience in Design Studio
P.1	Assistant Professor	38 years
P.2	Assistant Professor	15 years
P.3	Assistant Professor	17 years
P.4	Assistant Professor	25 years
P.5	Assistant Professor	13 years
P.6	Professor	20 years
P.7	Professor	38 years
P.8	Associate Professor	18 years
P.9	Assistant Professor	10 years
P.10	Associate Professor	38 years
P.11	Lecturer	25 years
P.12	Assistant Professor	20 years
P.13	Professor	22 years
P.14	Professor	23 years
P.15	Professor	23 years
P.16	Associate Professor	20 years
P.17	Professor	32 years
P.18	Assistant Professor	8 years
P.19	Assistant Professor	6 years
P.20	Assistant Professor	13 years
P.21	Assistant Professor	21 years
P.22	Assistant Professor	20 years

### Data Collection

Semi-structured interviews were carried out with the design educators as the main coordinators of design studios, who are capable of giving information about the subjects given in educational

projects and the changing paradigms of design discipline that affect the project subjects. The interview guide aimed to find out answers to the questions related to (1) the importance of project subject in the studio education, (2) emerging project subjects in the studio education, and (3) new approaches applied in design studios. 21 of 22 interviews were conducted face-to-face and only one was carried out through Skype because of the geographical distance. All the interviews, which took between 60 minutes to 150 minutes, were recorded, then listened and transcribed verbatim. The whole process of data collection was completed in nine months.

### **Data Analysis**

The interviews, which took between 60 minutes to 150 minutes, were recorded, then listened to and transcribed verbatim. The Word document forms of the transcribed interviews were analyzed by using a content analysis method regarding an inductive perspective. Initially, the transcriptions of the interviews were read sentence by sentence and one/more code was assigned to each sentence. Then the codes were analyzed to group the similar codes under the categories defined by the researchers according to the concepts determined from the data (Strauss and Corbin, 1990). When the first round of coding completed, the relevant codes were arranged and put with similar ones together in themes. In the second round of the coding process, all the themes and codes were gone through and regrouped based on frequency and relevance. According to the framework finally built, the illustrative quotations, which promote the findings of the study, were defined and translated into English.

## **Findings**

### **Importance of Design Studio Courses and Project Topics**

In response to the initial questions trying to find out the importance of design studio courses in the industrial design curriculum, most of the lecturers shared the same opinion by using words like “backbone, basic course, and heart”. Emphasizing the “backbone” metaphor, lecturers wanted to point out that the studio course takes an important place in the curriculum while other courses serve for it with a successful integration.

The interview data has justified that the design studio courses provide a convenient environment for the students where they can learn about design and practice in different conditions by being given diversified design problems. This issue can also be confirmed with the concept “design studio as a simulation medium of professional design life” that was defined by some of the educators as a hallmark of the design studio. With the recognition of the design studio as “simulation”, academicians believed that the students should meet and work with as many different subjects as possible until graduation. One of the scholars expressed the importance of the project subject as a tool of learning or teaching design-based knowledge and skills:

*The subject is something like the point that you stick in the needle of the compass (drawing tool). But the diameter of the circle can be drawn in different ways and the way you address is more important. What is included or not included in the circle is the thing that we distribute according to the class level. (P.14)*

The explanation above is also related to the hierarchy of the project scope changing from sophomore year to senior year. Similarly, most of the interviewees remarked the significance of

hierarchy as the main criteria that should be taken into consideration in the process of topic and subject decision. According to the interviews, it can be said that the project subject is decided depending on the aims of the project course regarding the learning skills and design knowledge that students should obtain. As a result, the distinctive diameter of the circle mentioned above takes shape according to ways that how lecturers want students to deal with the subject.

### Changing Paradigms of Project Subjects

In the findings, it was discovered that there were two major change factors affecting contemporary project topics given in design studio courses. New disciplines related to design and the emerging design concepts in different contexts were the two main themes generated from the interview data analysis.

#### *New design areas*

During the interviews, academicians mostly mentioned emerging areas as designing services, systems, interactions, experiences, and user experiences with which industrial product design students started to deal. Under this theme as it is seen, the outcome of the design process in the design studio has started to widen its content from only a product to a product with added its surroundings such as experiences, systems, and services all of which need to design from a holistic perspective.

Designing systems has been the most addressed concept that began to appear on the agenda of industrial design studios with the potential of affecting project topics and contents. Academicians believed that besides and beyond designing products, implementing systems, services, and experiences to the design projects was necessitated by technological and digital improvements as following statements of two interviewees represent:

*There are new things that designing with computers brought into. Previously in here (university), we did not use to do system design. But now, when we give a subject "a vehicle design for islands of İstanbul", the issues like how it works, how it is called on and so the issues of I-phone applications automatically gain importance. (P.1)*

*User experience is not only related to the use of the product but also the effect it leaves before the time of use and after the time of use. When we think of all as a whole package of product and service, the experience occurs. When the products became technology-centered and even the technology started to integrate into the products that we do not expect them to be digital, services have unavoidably begun to involve in. (P.16)*

Likewise, one of the participants exemplified the complicated side of user interactions with physical and non-physical components of technology embedded systems with the project called "Smart home system design" through emphasizing the importance of total experience in some cases, where the physical experience is lacking:

*For example, when we think smart home systems, maybe the product is a system and it has sensors in several areas. It senses weather conditions, it senses light, and it presents something to me. This is also embedded in many places in my home. I cannot experience the product physically. But, because of the total experience that I live, isn't it getting into our area (design)? Actually, it is... (P.17)*

The issue of indispensably going from tangible to intangible has made some of the scholars worry in terms of students' reaching design solutions quickly by making applications (mobile



phone applications) and spending less time on designing three-dimensional forms. In response to this, one scholar criticized that the increasing interest in digital and communicational technologies between students caused them to neglect physical object design:

*Students immediately tend to design application-based solutions. They design the form just as an ordinary box. The importance of three-dimensional product design has started to be pushed into the background. (P.12)*

This situation caused some of the academicians to approach warily to non-product-centered project subjects as service, system, and experience design projects. Most of the interviewees especially believe that the major aim of industrial design education is still to train designers who will design three-dimensional industrial products. As one of the scholars explained, the adaptation of new notions to design projects can be managed with regarding the conditions of Turkey:

*Even in a design process of services, product design should be engaged in absolutely. Because there is still a need for that in Turkey, we don't give this away. But in addition to this, the projects focusing on experience design, design thinking, or service design are also acceptable for us. But there is certainly needed a one to one product model made by the student at the workshop in terms of classical (traditional) approach. To conduct the process and to make a prototype are also the parts of the design process that they try to manage by themselves. (P.22)*

As a result, academicians have tried to find a way to implement new disciplines to design projects by compelling students to design at least one three-dimensional product even if the project topic is specially focused to design services or experiences.

As the results of the interviews showed, the new areas of design (service design, interaction design, experience design, and user experience design) indispensably were diffused into the educational projects having an impact on the characteristics of the output. Intangible and non-physical properties started to be discussed rather than the tangible and physical presence of the product. Since the digital components became inseparable parts of designed objects, interaction design, user experience design, and interface design became visible in the content of industrial design project courses. These new concepts highly started to take part in design terminology used in studios even if they were not specially underlined in the head of project topics. Only one of the lecturers expressed that they particularly preferred to conduct a mini oven design project with an interface design focus, with the aim of providing an environment for students to experience designing interactions and user experiences (P.19). On the other hand, design educators mentioned system design directly and it was possible to encounter this notion in the titles of the project examples that they gave.

### ***Emerging design concepts in different contexts***

The results of the interviews showed that emerging trends related to environmental context, social context, and technological context of industrial design discipline have affected the project subjects in design studios.

### ***Environmental context***

Most of the academicians shared the same opinion that the environmental context of design has started to be discussed in design studio courses increasingly for the last two decades.

Sustainability with its comprehensiveness was mostly mentioned concept in connection with the environmental context. It has also reached a position that, whatever design projects students work on, they should consider ecological factors for sustainable solutions. One of the educators explained the importance of environmental concerns as follows:

*They (conventional design dimensions) are essential, so is sustainability. Every product needs to have some kind of sensibility and specific responsibility. Therefore, we have to embed these into all the projects we conduct. So, we do not say anymore "Let's make a good product, and also carry too much vacuum in the packaging..." Even if we say this, students are aware of sustainable concerns and necessarily they include them in their design process...In our department, at each level of the project, the environmental context is taken into account naturally, even if the project subject especially does not underline it. (P.3)*

However, most of the academicians asserted that sustainable concerns were supposed to come to the stage at the later classes of industrial design studios such as the third and fourth classes. On the contrary, two educators from two different universities gave two project examples focused on sustainability, which were carried on with sophomore design students as second-year design projects. One of the topics related to sustainability studied in second classes was designing a water container to prevent people from using plastic water bottles and leaving them half-empty and as a result to decrease water waste. The other topic was designing a sustainable outdoor lighting unit for a sustainable house. Yet still, these attempts can be seen as primitive attempts that even the coordinators of those projects act with suspicion towards early interaction with sustainability. One of the scholars, who was in charge of giving a "sustainable lighting" project subject to first-semester sophomore design students, explained this dilemma as:

*We thought that could be difficult for the first project of the sophomore students, but nevertheless, we did it. We made them use 10\*10 cord led lights and a solar panel. Hence, this house also provided us a setting and we wanted them to imagine their design in such a sustainable life. Firstly, I doubt whether they are too junior, but then I thought there is no "before time" for this matter. The earlier they meet with it (sustainability), the more profit they gain. (P.14)*

On the other hand, some educators are opposed to focusing on sustainability in the projects of second-year studio courses. As one of them explained below, expectations from sophomore design students at the end of the year do not correspond to sustainability issues:

*When we conduct sustainable design projects with the design students in their second and third semesters, they get lost or they come up with very conceptual things. But, we expect students in the second and third semesters to make good models, to solve problems about detailing, and to conceptualize the project. Now, if the students do not gain these competencies in those semesters, they will have difficulties in the next ones. (P.9)*

Although there are different opinions about the semester when environmental responsibilities should be introduced to the students, interviews showed that it was crucial to increase the awareness of sustainability between students. Most of the educators agreed on the necessity of implementing ecological concerns to every single project topic and design process for constructing a mindset with a broader, holistic sustainability perspective. Moreover, one of the industrial design departments, from which five academicians were interviewed, had a more specific and systemic approach to the environmental issues in design studio education. One of them explained that third-year industrial design studios were rearranged in 2003 with a special focus on sustainability and social concerns (P.18). A sustainability-themed structure of design studio, which has continued to evolve, indicates the "significance of the sustainability notion" in educators' agenda within the context of studio education.

### *Social context*

Academics' opinions about the emerging themes affecting design studio subjects include the implication of social concerns which mainly involve sub-themes as socially responsible design, social design, and design for social behaviors. Even though most of the interviewees accepted that social concerns were important, only a few of them could exemplify project subjects they conducted which primarily focused on social problems. One of the scholars expressed how they attach importance to design for social behavior in the studio education by offering it as the main theme of graduation projects.

*For the last three years, we have been working on the subject of "Design for Social behavior" as a Graduation Project theme. Accordingly, students on their own were expected to find and define a problem area that is socially obstructed. And they ought to design a whole system including not only "internet of things" and "digital interfaces" but also "physical interactions". (P.3)*

Similar to the lecturer's opinions above, some other scholars also expressed the importance of socially responsible design projects among all other design projects. One of these scholars further explained that each student ought to have experienced at least one design project related to social responsibility before graduation. On the other hand, only three academics gave project examples focusing on social concerns; designing for the problems of refugees (P.17), designing solutions to the laundry washing problem of African countries (P.19), and designing for promoting the donation of clothing (P.22).

In contrast, some academics approached the subject (social design) in a negative attitude without emphasizing the significance of the concept. The challenges of studying social issues in design studio education can be listed from the educators' perspective as; having no time for it (in the course schedule), having no place for it (among the course contents), and having the possibility of causing unwanted provocations. One of the participants articulated that she wanted to focus especially on social design in the industrial design undergraduate education. Here below, she explained why she could not and cannot achieve it:

*When the students graduate, it is important to consider where they are going to work and earn money? In Turkey even in the production process of a vacuum cleaner, it is possible to meet with a lot of problems. Industrial design in a classical approach is still needed, only undergraduate design education connected with that subject (social design) is very risky for the future of designers... So, we can not completely focus on it (social design) and we ask them to work on both social design and classical industrial design. (P.22)*

As expressed above, lecturers cautiously approached in implementing newly emerging aspects of design as socially responsible design to studio courses. Though, quotes like "encouraging students who make projects in this manner" and "accepting social scenarios as design studio outcome" verify the growing interest in responsible design applications between both students and lecturers. Interview findings showed that the example of project topics emphasized on social problems generally were conducted with municipalities to solve the real problems of the local community and to accomplish regional development. While one of them focused on social responsibility, the other was about to design product and service solutions for underdeveloped countries to improve the life qualities of people.

### *Technological context*

Another emerging theme is the technological context, related to the technological transformation,

which has an effect on the economy and production modes and at the same time affects industrial design discipline and education. The term Industry 4.0 was launched in 2011 with the aim of increasing the competitiveness of the manufacturing industry (Kagermann et al., 2013). Internet of Things (IoT) and Internet of Services (IoS) help the industrial revolution become reality by providing an opportunity to combine the production and manufacturing world with the network connection systems (Kagermann et al., 2013, p.5). The lecturers mainly emphasized that the improvements in the context of Industry 4.0 have brought about new topics and subjects into the content of design studios “Internet of things”, “Smartness”, and “Production with 3D Printers” were the concepts some of the design educators referred to Industry 4.0.

As discussed in the section of “new design areas”, students of the digital generation are more liable to design an application quickly instead of a product when the project subjects are related to the concepts as information technologies (IT), smartness, and IoT. The explanation of an educator put forward the problematic side of the technology-oriented themed project:

*Two years ago, we carried out a design project for a smart home. When we announced the project subject to the students they got really confused. I tried to explain with the words “I know it is possible to make the project by only developing digital applications or benefitting from IoT. And also, it is possible to make a project without creating any physical product.” However, I certainly underlined the view that what we specifically wanted from them is to design a product, not only an application. (P. 15)*

Similarly, some scholars criticized the attitude of students in thinking over technology-oriented and paying less attention to the design of three-dimensional forms of products. According to the educators, industrial design students at a sophomore level should deal with more traditional subjects in which they can examine the basic components and process of product design as well as develop their skills basically needed such as sketching and model making. However, for the upper levels (third and fourth years) of design studio education, technology-related subjects can be more acceptable.

With the advent of the Internet and the democratization of information, a new type of designer who produces alone with the help of new technologies such as 3D printers instead of producing at the factories has appeared. According to the interviews, besides the use of technological tools in the design process, technological changing factors ensured future designers to obtain new roles as being designer-maker or designer-entrepreneur. On the other hand, from the user perspective, 3D printers have affected users’ relationships with the products and with the designers. Open design, which resulted from the changing role of the users in the design process from passive to active, was indicated by some of the lecturers as an important concept that students should be aware of. A project example described herein after shows the need for a different way of thinking to manage open design in real settings:

*There is a firm called “Open desk” which puts the Do-it-yourself (DIY) digital fabrication file on its website. You can buy that file and open it with any CAD or Cam software and cut the material you prefer on any CNC router. After assembling it whether at your own workshop or local maker space your table is ready to use. In that case, they do not sell you the table but the drawings of the table. So, by using this model we told the students to design their own templates that people could produce with the materials they can easily find or recycled materials. Basically, we said, “Do a DIY Project by taking into consideration the industrial design concept”. (P.14)*

DIY Project for Open Desk company can represent a good example of implementing emerging concepts to design studios to help students gain experience in the changing contexts of the design discipline. When it comes to the concept of DIY, it can be said that this project (DIY) is

also related to the environmental context of design. But in the analysis process of the interviews, the focus context that lecturers explained while giving project examples was primarily considered to classify the projects in terms of contexts. The point of educators' views in approaching the project subjects provided the main data source in grouping the concepts under the themes.

### **New Approaches In Design Studio Education**

According to the interview results, two significant emerging approaches applied in design studios can be listed under the themes "collaboration" and "interdisciplinary".

#### ***Collaboration***

During the interviews, almost all of the scholars indicated the increasing importance of collaboration in the design studio and design projects. Though they put a huge emphasis on industry collaborative design projects, they also identified different partners to collaborate such as municipalities, non-governmental organizations, and other corporations including schools, museums, coffee shops changing depending on the content of design projects (Table 2).

#### ***Collaboration with industry***

Interviewees defined the increase of collaboration with industry as a changing dimension for design studio courses. Some of them explained the reason behind this rise with the growing demand of industry to industrial designers and so on growing interest in working with them. Most of the academicians specifically overemphasized the role of industry collaborative projects that each design student ought to have experienced at least once before graduation. In the following quote, one of the lecturers explains the benefits of working with industry in design studios from different perspectives:

*One of them is rehearsing for the job (designer in a company) expected from students to do, the second is recognition of our students by industry organizations and also making them (industry) see how our design process is carried by experiencing one-to-one. And maybe the third can be inspiring the industry with the topics we bring forward and somehow helping them to think on those topics and directing the future works of industry. (P.17)*

**Table 2.**

#### ***Collaboration partners***

<b>Partners</b>	<b>Examples from interviews</b>
Industries	Furniture industry
	Packaging industry
	Transportation industry
	Electrical household
	Industry Medical industry
Governmental organizations	Kadıköy Municipality
	Seferihisar Municipality
	Bornova Municipality
Non-governmental organizations	Mother Child Education Foundation



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	Hüsnü M.Özyeğin Foundation Turkey Spinal Cord Paralysis Association Turkey Handicap Association Mind your Waste Foundation Turkish League Against Rheumatism Çiğdem Education, Environment, and Solidarity Association
Others	Bursa Science Museum Veterinary School Makers Turkey Private Ayşeabla Schools

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According to the interview results, working with industry in design studios in Turkey firstly started to be practiced systematically in the graduation design studios of two different design schools of Turkey; Middle East Technical University (ODTU) and Istanbul Technical University (ITU) at the same time, at the beginnings of 2000s. Interviews showed that other universities have also been conducting design projects in collaboration with industry for a long time. Yet, building one of the compulsory design studios based on industrial collaboration and maintaining its continuity made the collaborative project experiences of ITU and ODTU be mentioned as systematically successful cases in the timeline of the last twenty years.

“Design for SMEs” started with the idea of introducing senior design students and industrial design processes with Small and Medium-Sized Enterprises (SMEs) which constituted a clear majority and reality of Turkey’s economic conditions except the dominant firms employing only a few of graduated designers (P.6). At about the same time, Graduation Projects of ODTU started to include company support with a well-defined design process structure for both students and the companies. Although “Design for SMEs” graduation project concept of ITU came to an end in 2013, the “Graduation Project” concept of ODTU still keeps its identity on implementing industry-collaboration to design studios. Moreover, some of the interviewees mentioned that their industrial design departments have begun to take up seriously working in collaboration with industry regularly for a few years.

The relationship between industry and design departments has also changed over the years by taking care of mutual benefits. However, studio coordinators revealed that what students could gain from this collaborative work was more important than the company’s requests. Most of them agreed in following a pragmatic approach for transforming the scope of project topics offered by the firm to an educational project. In relation to the increase in the number of industry collaborative projects, scholars explained that they started to go towards more sector-related project topics with the aim of preparing students for the professional conditions of Turkey. They suggested furniture, packaging, electrical home appliances, and shoe sectors that have the potential to employ industrial designers. According to the interview results, the medical sector was the main emerging sector that will be increasingly in need of industrial design and industrial designers.

### ***Collaboration with Governmental organizations***

Depending on the increase of the issues regarding public use and social concerns in design studios and at the same time in the agenda of the decision-makers of public utilities, the collaboration has started to be an indispensable part of the local design process. During the

interviews, not only the companies but also governmental organizations such as Municipalities were listed as partners in the collaborative projects conducted within the design studios.

*After all, we care about carrying out a design studio with different stakeholders and also care about getting the insight or know-how outside of the studio. If you are creating something, it is not going to happen in a space or a vacuum. As I said before, improving something in this country is related to knowing how it works. Municipalities are very important stakeholders from this standpoint. (P.14)*

As explained above, going out of the studio environment to solve design problems necessitated getting in contact with the users, decision-makers, and the people who are responsible for the scope of the design problem. Moreover, as some of the interviewees declared, in Turkey the interest of the Government in design has gained steam for the last twenty years. Kadıköy Municipality (İstanbul), Seferihisar Municipality (İzmir), and Bornova Municipality (İzmir) were the governmental organizations giving support to the educational projects that lecturers reported during the interviews. Likewise, the neighborhoods as the smallest part of local authorities were collaborated with to enhance local and community life. One lecturer explains the scope of project subject related to the problems of local life, which was conducted in collaboration with local government:

*The project was to design a product/service/ PSS which will create interaction in the neighborhood by using information systems. For example, designing solutions for the places in the neighborhood that seem like unsecured and dark to make them more lighted and pleasurable. (P.14)*

Another project example obtained from the interview results was the graduation project carried out in 2011 at one of the private universities. This project focused on the design of sustainable vehicles to be used in Seferihisar, which assumed the title of the first slow city of Turkey. During the collaboration process, the students visited the city and obtained the needed information from the local authorities to define project scope through considering daily problematic areas of the city and the regulations of slow cities to support sustainable development (P.3 and P.4).

The examples presented above show the need for a new type of collaboration between student designers and local and governmental organizations to be able to create solutions to real problems of locals and make their lives better. However, according to the interview results, in comparison with industrial companies, governmental organizations can be accepted as newly rising stakeholders to collaborate in design studios.

#### *Collaboration with Non-governmental organizations*

Like Governmental organizations, the scholars who noticed Non-governmental organizations (NGOs) as collaboration partners were few in numbers compared to the industrial companies. When the answers were analyzed, it was seen that there were two types of NGOs industrial product design departments preferred to collaborate with. One of them was based on the aim of getting closer to the special user groups who are difficult to reach and research such as disabled people or children. The second type was based on the aim of increasing social and environmental responsibility awareness in society and using design while making it. One scholar explained the dimension of the relationship between an NGO (Turkey Spinal Cord Injury Organization) and design students during the process of understanding rheumatoid arthritis (RA) patients who have disabilities in their hands:

*For example, the foundation brought a pair of gloves. When the students put them on, they were hardly able to move their hands. Therefore, the students can understand the difficulties that the RA patients experienced while they were holding something or carrying a bottle. (P.9)*

Another project example given in the interviews was with the topic “Sustainable Scenarios for Çiğdem Neighborhood” which aimed to define problems of the local community and design sustainable scenario solutions for them through a participatory approach (P.18). In this project, students studied in collaboration with Çiğdem Education, Environment, and Solidarity Association in Ankara and with the users and local people as well.

### *Others*

Other collaboration partners in design studios consisted of different types of corporations, which are varied based on the project topics and project aims. Collaboration with a Science Museum (public institution) for the project “Science teaching set for students”, collaboration with Veterinary School for the project “Product Family for improving the well-being of cats and dogs”, collaboration with Kronotrop-Coffee Bar&Roastery for the project “Coffee machine”, collaboration with Private Ayşeabla Schools for the project “Washbasin design for children”, and collaboration with Makers (Makers Turkey) for the project “From project to product” were the collaboration examples that academicians referred to.

### *Interdisciplinarity*

Interviews showed that working with other disciplines was one of the main skills design students should gain. More than half of the educators talked about the value of an interdisciplinary approach in design education. However, there were design educators who thought some of the emerging approaches as interdisciplinary could hardly be included in the restricted time of design studio. One of them stated this point of view from his perspective:

*I think students basically should learn how to make a project. As I said before (T-shaped designer\* example), we can only teach them vertical properties (vertical properties of T-shaped designer) here (our department). The interdisciplinary approach is somehow moving into special/secondary qualifications (horizontal properties of T-shaped designer), which students can gain and develop after graduation in their future work areas. (P.9)*

Unlike the opinion above, few educators believed that an interdisciplinary approach was supposed to be implemented into design projects. When these interviewees were asked to give any project example experienced in their design studio courses, only one project has appeared. The “Common Project” called by scholars like this, was the only example of an interdisciplinary project carried out within the context of the compulsory design studio. Industrial Product Design department, which took part in the Marmara University Faculty of Fine Arts, conducted one of their third class design studios between the years 2002-2011 in collaboration with some of the other departments (Graphic design, Textile design, Interior design, Ceramic, and Glass) of the faculty. Two of the scholars interviewed from Marmara University gave information about the

\* “T-shaped” person is described as a specialist who has broader knowledge and skills of other disciplines (Kelly, 2005).

“Common Project” explaining its emergence, its contributions to design students, and the project subjects worked in it.

*Interdisciplinary projects first started in 2002. We have an advantage like; there is the interior design department on the top floor, the department of textile is to the right, and downstairs there is a Graphic design department. So, it is easier to create and apply that kind of a project. (P.1)*

*As a project subject for example, in the design of a gasoline station industrial design students designed the product, textile students designed the apparel, and graphic students made graphics and promotion. They worked as groups. (P.2)*

*They (students) are aware of the fact that they will work somewhere with other disciplines neck and neck after graduation. Within an agency, industrial designers, graphic designers, and the others can be together from time to time. At least it is important for them to gain experience in working together. (P.2)*

On the other hand, there were interdisciplinary project examples mentioned by some of the lecturers during the interviews. Though, they were implemented to elective courses or compulsory other courses instead of compulsory design studio courses. Those interdisciplinary project attempts, which can be counted by the fingers of one hand, could be important if we would research the place of interdisciplinary in overall design education. From the aims and perspective of this paper, this data can be used to consider the difficulties of making and managing an interdisciplinary project within the compulsory design studio courses explained by one of the scholars here below:

*Because of different education styles, there must be met at some common points to be able to speak a common language between different disciplines. Otherwise, it is not productive. Personal things, egos, etc... These kinds of issues must be well organized. I do care so much about interdisciplinary projects. However, we are still in the learning process in Turkey and the structures of the universities are not suitable for that. This area must be improved in terms of the curriculums of the faculties. Several things should change according to it (interdisciplinarity), otherwise, you cannot make a project together. (P.22)*

Therefore, even though educators believe that interdisciplinary projects are important for design studio education, there are still many challenges in practice for design educators, design departments, for other disciplines, and even for the university administrations to overcome.

## Results

In this study, the aim was to reveal the changing paradigms of undergraduate design studio education in Turkey in terms of project subjects and the approaches that have been current design issues after the 2000s. The reason behind defining compulsory design studio courses (starting from sophomore class to graduation project) as a research area is the belief that design studios provide a suitable environment for both students and educators to experience and learn the new concepts and trends that industrial design deal with.

Growing design areas and changing contexts emerged from literature research and interviews can be stated as the main themes that caused project topics to change in time. According to the research findings, the terminology used by educators during the project process has been affected and transformed a lot while the scope of design is expanding. Technologic advancements and digitalization made service design, PSS design, UX design, and interaction design as compulsory areas that industrial design students have started to address. Moreover, within the frame of industrial design studio education in Turkey, it can be said that service design without any physical product outcome, rather than product-service systems, is hardly

accepted in design studios as a project subject. It was discovered in the study that there were project topic examples involving the design of products, services, and systems (at least two of them together). However, none of the examples given by interviewees ended up only with an intangible service outcome.

UX, which cannot be a subject of design project separately in design education, is being embedded in most of the project subjects. However, since UX has its own methodologies, how students design user experiences and in which level the educators help them in the design process can be questioned. Experience design which is a broader concept involving UX can be accepted as an area that academicians are more likely to speak of in the design process and apply to almost every kind of design project. Experiences have gained importance going along with the increase in the implementation of user research into design studios in recent years. As a result of the research, while UX is seen as a separate area from industrial design discipline, the experience is accepted as a concept that is extremely used in the terminology of design studio by both educators and the students.

The theme “Emerging design concepts in different contexts” was another topic arising from the research, which allows us to evaluate the implementations of them to design studios. Whereas sustainability related to environmental context has become to be considered in almost every project free from the project topic, the social design has gradually been implemented into the design projects of studio education. The limited project examples coming from the interviews were generally concentrated on the social responsibilities of designers. But at least, the special interests of academic staff in social design contribute students to increase awareness in the social context of design, which may provide a basis for their future career. In the context of technology, with the help of technological breakthroughs, project topics studied in design studio courses mostly concentrate on concepts like IoT, smartness, and open design with a high increase in designing technology embedded products and services.

The research found out that collaboration as an approach used in design projects a lot in today’s design studios have progressed over the years. However, the collaboration with industry started at the beginning of the 2000s for educational design projects, there are still conflicts between the academicians about the level of implementing it in the studio. The more schools maintain working with industrial companies, the more companies tend to work with students. Sustainable relations and mutual improvements after completed collaborative projects can help to make industry-university collaboration more effective. We can say that other collaboration partners including both governmental and non-governmental organizations have emerged in recent years. With the experience of working with them, students become aware of whom they are supposed to collaborate with to solve the problems of society and the special groups who are in the target of non-profit foundations as disabled and disadvantaged people. With the help of collaboration, the university projects become more realistic by interacting with the partners out of the closed doors of the design studio to solve real problems.

On the contrary, the applications of interdisciplinary approaches in design studios can be regarded as initial attempts, which are mostly practiced in elective design studio courses instead of compulsory ones. Because of the challenges educators encounter in conducting interdisciplinary design projects corresponding to Simpson’s (2010) four barriers as “resource issues, faculty issues, students issues, and pedagogy/curriculum issues”, they have got to approach distance to the projects in collaboration with other departments. But at the same time, most of the scholars believe that more interdisciplinary projects should be implemented to the



design studios to educate designers of the twenty-first century acknowledging the importance of interdisciplinary team experience.

Although the literature findings draw attention to the changing position of the user in the design process by asserting concepts like co-design and participatory design, only a few project coordinators mentioned that industrial design studio education should include design projects that can make design students experience designing with users. Compared to other prominent approaches obtained from interviews as collaboration and interdisciplinary, the involvement of users in the design process did not provide enough data.

### **Discussions**

This study revealed that many studio educators from different schools try to follow global trends and implement them to design projects. Besides, there are local restrictions and conditions (lack of socially concerned project examples) related to the design profession (difficulties in finding a job) that they have to consider while educating future industrial designers. However, to be able to train well-equipped designers who are capable of adapting to dynamic changes, new trends and approaches should be articulated to the traditional industrial design education. Since the priorities of industrial design education in Turkey are still based on the manufacturing economy, we think this study will start a discussion about how departments of industrial design have responded to the changes happening in the global design world. Design research based on both the interviews with design studio educators and the supporting theoretical literature is the main source that feeds this study to find out the topics and trends in the design area. Accordingly, this research offers an insight into the substance of design studio education beyond the closed doors and discovers various design concepts and design approaches emerging and gaining popularity in design discourse recently. For the future, it will be very interesting to try to trace the parallels or differences among these fields to see how and to what extent design education is fed by the literature and current discussions.

This research, with its comprehensive approach, has intended to take a glance into the industrial design studio education in Turkey from the perspective of design educators, in reference to the literature review on broadening boundaries of design. Considering the limits of the interview technique, it is known that the findings and results would be enriched with additional resources apart from educators' opinions or with insights from more educators and students as well. The following studies may discover the changes in design studios by using different research methods to gather different types of data, for example, more participatory or ethnographic.

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