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Experiences on the perception of two- and three-dimensional concepts in interior architecture education

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Abstract

In the study, at the Department of Interior Architecture and Environmental Design, Biruni University, in the 2019–2020 academic Fall Semester 1, in the scope of "introduction to Project 1" course, the applications of the students in the semester are discussed. During the implementation process, each student created original three-dimensional works based on the original works of Piet Mondrian. They have converted two-dimensional paintings into three-dimensional works with utility elements such as cubes, rectangular prisms and bars, with model materials to be used in their chosen areas. In the last stage, they drew the top, front-back and right-left side facades of the three-dimensional works. As a result, the students experienced a process in which they gained self-confidence, were not afraid to experiment and achieved successful results without being within certain limits with their original design approaches in their first studio experience. It was seen that they grasped the importance of learning by seeing, creating alternative solutions with trial and error method, expressing visually and experiencing in studio work. They have obtained a useful studio experience in which they can draw, transfer what they see and develop their manual skills with the concepts of ratio, proportion, scale and perception with the studies done.

Keywords: Project, design, studio space, experience, three-dimensional perception.

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1. Introduction

The basis of training in design fields such as architecture and interior design is laid in design studios, and it is essential to design a purposeful approach by considering an idea and a subject. As Schon (1985) stated, the fact that it specialises and privileges architectural education, focuses on learning through education, experience. Therefore, it is aimed to educate designers who think freely from the first year of education, can transfer their thinking in two and three dimensions, can start out through different examples by doing research, think, discover and develop their creative attitudes.

Ayiran (1995) says that the creative process is not just about consciousness and intelligence. According to the author, a thinker is in the creative process, under the domination of her/his emotions from the beginning to the end. Therefore, in the creative process, the items related to emotions are those related to intelligence; irrational elements appear more important than the rational ones (Ayiran, 1995). In this context, students are asked to bring new interpretations with different forms of expression in their studio work and to present original and new designs, because originality is directly related and determinative to the concept of creativity in terms of both being original and personal (Turkkan & Erdem, 2016).

What is designed in the mind in the relationship between design and creativity and what is missed to be realised is the 'image' designed in the form of dreams and dreams, which is not found in the physical dimension but is formed in the mind by imagination and intellectual ways. As a result of transferring this formation to the physical dimension with technical and aesthetic knowledge, creativity actions accrue (Bayburtlu, 2011).

Undoubtedly, the most important needs of living things are the urge to take shelter in a place and use it in line with their needs. With the help of human consciousness and the ability to work in an organised manner, it constantly examines the subject of creating space to meet their vital needs (Demiraslan, 2007). Creating a space is an action that has diversity in terms of its content and organisation since the existence of humanity. Many professions have emerged to meet this action; various discoveries, productions and applications have occurred within the scope of the design discipline. The profession of interior architecture has emerged as a discipline that provides service in general in this act of creating space and the design of all the elements in it and has gained importance day by day.

2. Design studio in interior architecture education (workshop)

As in the design areas that have different disciplines, studio environments have an important place in interior architectural design education too. The first year of education is the transition to a studio (workshop) environment that criticises, studies and inquires students who come from an education system based on rote and test and also targets the free and original thought system. Studios in design education are based on learning by doing; a common study for the education of disciplines in the field of design is to evaluate as the field of experience. Because most of the design process is handled, examined, shaped and reaches the result in the workshops which we call as working environment/area. In connection with this, as Shaffer (2002) stated, the design studio is the ideal learning environment and experience in studio education is a valuable guide. The studio system consists of a system built on the basis of expressiveness activity.

The way of thinking and new trends that change over time in a rapidly changing and developing world also affect the field of education in design. In the education system, which includes all these dynamics of the design fields, an approach is required in which the relationship between thought and form is established, using creativity and a forward-thinking system. Therefore, the production, use and evaluation of information that increases innovation and development play an important role. In a world where changes are frequently experienced in all kinds of fields, interior architecture students should also develop different ways of thinking and practice that can meet this diversity. Because as

Yurekli (2007) also states; design education is not learning, it is a process of creation, experience and research. Accordingly, designers who can think, question, observe, research, think critically and analytically, use information from different directions and offer alternative solutions to problems should be trained.

The studio tradition in design education is the core of learning architectural or interior architectural. This experience includes various difficulties in terms of the knowledge fields that the design is related to and the quality of the designers as a different activity. In the studio culture of design education, the designer candidate is expected to cope with various difficulties in order to design and at the same time develop his/her designing skills under the guidance of studio managers who are more experienced in design.

Thanks to the communication between 'inexperienced individuals' who have received design education and more 'experienced managers'; in this regard, the concept of design is a holistic fiction in terms of both the intuitive and logical aspects of the designer and their conscious orientation (Turgay, 2015).

One of the aims of design education is to develop visual perception, to gain skills such as creativity and originality and to transform it into a product in this direction. The basis of design education lies in gaining competence in the visual field, and the design education process also consists of assimilating the design concepts, understanding, applying, examining, evaluating and visual perception of their relations with each other.

Interior architecture education consists of a series that changes from a simple whole to complex solutions to complex organisations. Controlling this series with an ongoing experimental study is an important element of the combination of knowledge and practice. It is envisaged to implement a program that will increase the imagination and problem-solving ability as well as benefit the students from the examples they see with their own intuition. Imagination is the result that occurs from the acquired knowledge. To dream is to achieve a kind of synthesis. The process continues in the form of narration and transfer of this dream. A lecture is carried out with various presentation techniques. Both actions are skill jobs that can be acquired, and students are provided with this skill in the workshop. For this reason, project workshops are the backbone of design education. In one approach, to this aspect of education offered in universities in Turkey, architecture and interior architecture are applied, and wide project workshops constitute the backbone of the curriculum (Gul, Cagdas, Gul & Caglar, 2014).

A design studio should enable "personal experience" from the beginning of the work and create an environment in which people can be free in their conceptual world. It should also be able to motivate the "subjectification" of the process of handling the design problem (Yildirim & Guvenc, 1995). That is; it is possible to find the clear expression of activating the student and allowing him/her to develop by freeing himself/herself by trying, learning, doing and exploring the basic features of the material, colours and textures in purification from past patterns (Broadbent, 1995; Uluoglu, 1990).

Creativity consists of a process, and at the end of this process, any different objects, an invention, a discovery, a thought, a project, a design and so on emerge. The resulting products emerge as the product of experience, questioning, research, observation, perception and work acquired in the process. Creative thinking is related to our memory, our past, what we are experiencing now and our future. In connection with this, besides socioeconomic conditions, aesthetic, cultural and spiritual values also contribute to the formation of creative thinking.

In design studios (workshops), which is an experience, working environment, students and lecturers communicate with each other, exchange ideas, design, comment, discuss and produce on students' works. At this point, the responsibilities of the lecturers in the studios are to ensure that the students have a flexible attitude, to bring various perspectives, that is, it is very important for the student to think differently, to reveal her/his creativity by working together with her/his intellectual, visual and tactile senses.

3. Design studio methods

The constantly changing and developing living conditions have a great impact on architectural design approaches. This situation directly affects the approaches developed in architectural education. In parallel with the radical changes in architectural education, design studios, one of the leading actors of this education, should also include these innovations. Studio education should incorporate innovative design methods, be open to new content and approaches and should also enable innovations in students' design decisions in this process. As well as the equipment used in the educational environment, it is studied to create educational strategies that may be the most positive for architecture students. While creating these strategies, undoubtedly, the experiments made in the past are evaluated and new aspects are produced by identifying the deficiencies. Various ways are followed in problem solving, and these ways are shaped for various purposes (Erbay, Zorlu, Akgul, Onur & Aras, 2013).

In architectural education, design studios are the areas where designers and students spend the most time and design methods, and program outcomes (teachings) are spoken and discussed the most. In other words, design studios are working environments where students discover their talents, develop their skills and express their opinions clearly in design fields such as architecture, interior design and industrial design and where a personal experience takes place. Although various methods are applied in design studios, intellectual and formal methods are widely used (Table 1). These methods serve the purpose of obtaining a creative result product in the design process.

Table 1. Intellectual and formal methods (Onur & Zorlu, 2017)

Methods	
Intellectual methods	**Formal methods**
Creative Drama Method	JuanGris and Malevich Tectonics Method
Metaphor Method	9 Square Grid Method
Informal Education Method-Game	Rule-Based Format Grammar
Quality Ranking Method	Evolutionary Design Method
Mind Map Technique	Genetic Algorithms
Association Technique Method	Text-Format Grammar
Six Hatted Thinking Technique Method	Analytical Method
Brainstorming Method	Block Problem Method
Scamper Method	
Harvey Cards Method	
Concept Maps Method	

Some of the methods mainly aim to develop the creative thoughts of the designer candidates, while others aim to improve the students' three-dimensional thinking and form-building skills. The basis of the intellectual methods that foster creative thinking is the discovery of creative personality traits. These models also serve to reveal the potential of the creative product through the creative person. Creating a creative form, which is an objective transformation of creative thinking, is the result of a creative process. At the end of this dynamic process, design ideas are transformed into three-dimensional form designs that establish the link between the form and content required by the design education and enable the creation of the visual language. On the other hand, formal methods serve the creative product and its development at this stage (Onur & Zorlu, 2017) (Figure 1). Intellectual methods are thought-centred methods, which are based on the idea of creativity, which consists of a process involving studies for the discovery and enhancement of this idea. In connection with this, the focus of these methods is to reveal the creative personality traits and thus the creative result products.

Formal methods, on the other hand, are models focused on creative products and their development. Creating a creative form, which is an objective transformation of creative thinking, is

the result of a creative process. At the end of this dynamic process, design ideas are transformed into three-dimensional form designs that establish the link between the form and content required by the design education and provide the visual language. All of these methods are brought to an agenda at the synthesis stage of the design process in order to produce a creative product. Formal design models, which are tools for teaching canonical, pragmatic, analogical and typological design approaches, are tools that lead three-dimensional thinking by combining various combinations by both fulfilling specific requirements and providing some useful ways. Formal models are used to create original, innovative, flexible, unusual uses and functionally satisfying forms in two- and three-dimensional compositions in order to develop the ability of the designer candidate to produce forms. These methods can be given as examples such as Juan Gris and Malevich Tectonics Method, 9 square Grid Method, Rule-Based Form Grammar, Evolutionary Design Method, Genetic Algorithms, Text-Form Grammar, Analytical Method and Block Problem Method. All these formal methods that give the student some kind of discovery process are two- and three-dimensional formal composition exercises (Onur & Zorlu, 2017).

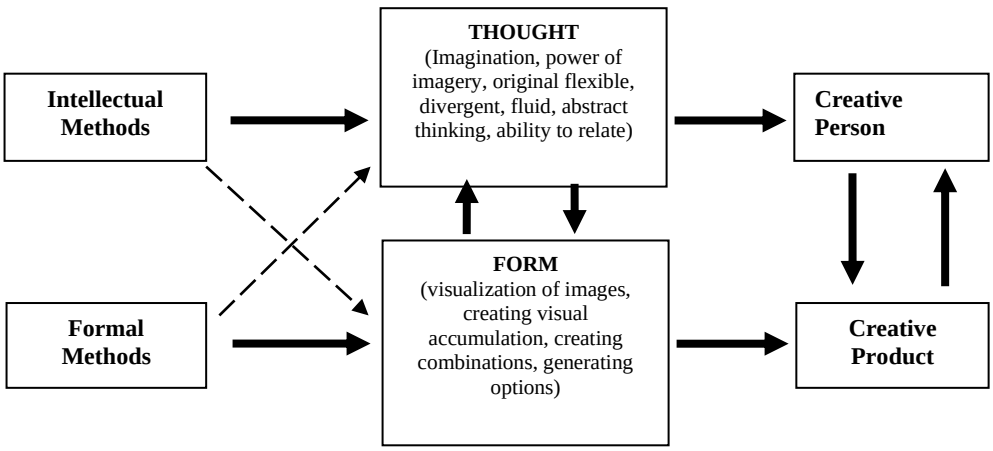


Figure 1. Creativity relationship of intellectual-formal methods (Onur & Zorlu, 2017)

Students who gain the ability to create different compositions by making different designs through various form experiments increase their creative power by expressing their designs, thoughts and presenting them in various ways. These methods allowed them to convey their thoughts in different forms of expression, to perceive and apply two- and three-dimensional concepts.

3.1. Block problem method in the design studio

"Block Problem Method", which is one of the formal methods, is a two-dimensional and three-dimensional formal composition exercise, especially applied in early design studios. Modular blocks of various sizes and materials are placed on the area provided as exercise pads. It is expected that abstract spatial exercises and an exploration process will be created using basic geometric forms (Yazar, 2009).

The design of the form can be realised by combining the features and functions that make up the two-dimensional elements and forming a whole. The new forms designed can be among the simplest two-dimensional geometric forms (triangle, square, rectangle, trapezoid and circle). In case In three dimensions, from the pyramid to cube is shaped towards its rectangular prism and sphere. These designed forms, in terms of their qualities, are internal-external, positive-negative, static-dynamic, closed-open, abstract-concrete and organic-inorganic forms (Kaptan, 1997). In this context, two-dimensional drawings made on paper and three-dimensional studies that enable them to be perceived are the expressions of formal methods that convey the design in the first year of design studios.

It is stated that the block problem arises from the experience of abstract painting (Candido, 1989). Thus, students will be able to develop creative thinking and application skills for free and original works in the studio environment, which we call their own workspace. Two-dimensional drawings, with three-dimensional perception and visualisation in the mind, play an important role in the design studios in transforming this into a three-dimensional result product. In this respect, student studies were carried out under the direction of two faculty members in the scope of 'Introduction to Project 1' lesson using the block problem method which is appropriate for studio education.

4. Studio work

In many periods of history, the relationship between architecture and other branches of art cannot be ignored. Some elements of architecture base other disciplines related to or related to architecture, other branches of art. Since the phenomenon of inspiration in architecture coincides with mimicry, it is more preferable to take inspiration from another art discipline and interact with another art discipline. It is perceived as the transformation of content into a different language, into a different space, as in the case of translation from one language to another (Atalay, 2004).

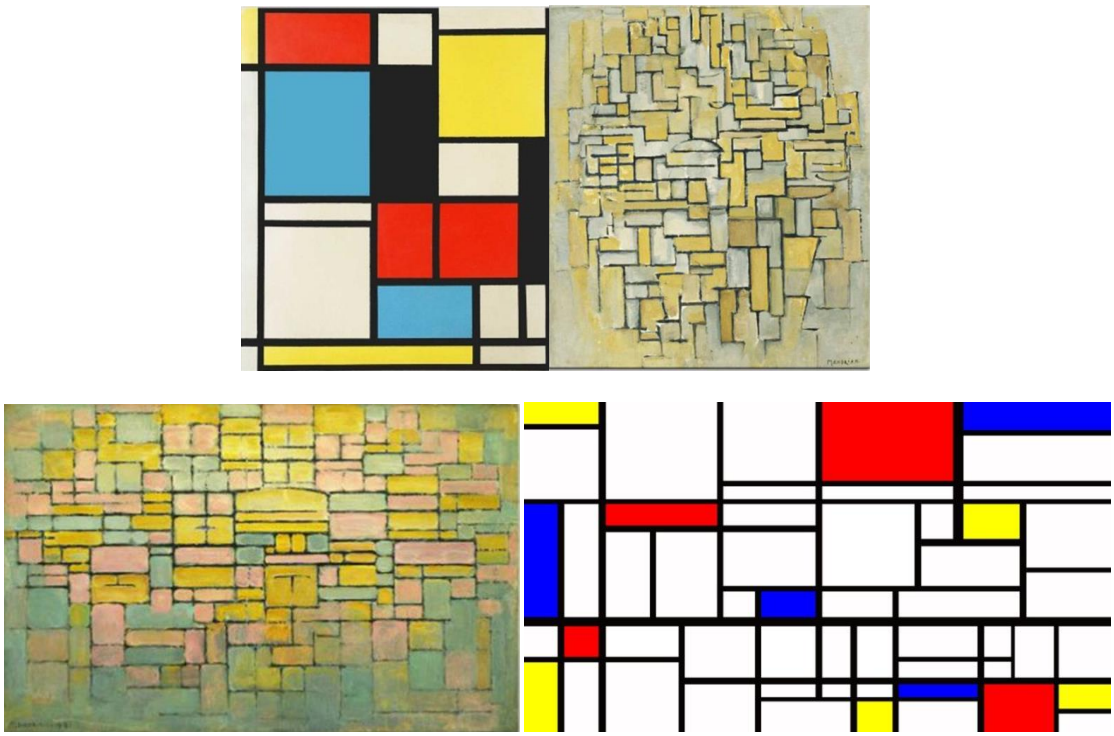
Art of painting, to be a pioneer among the other art branches on understanding artistic development and mirror, many art movements spread to the developing world through the art, architecture and other arts in interdisciplinary studies, makes the picture stand out more. The interdisciplinary interaction between architecture and painting arts began in the 1900s, the period when the twentieth-century understanding of art developed and changed in the light of various economic, social and cultural developments and continued with the Cubism movement in the early twentieth century, with the Bauhaus and De Stijl groups (Antmen, 2009).

In the De Stijl (current of architecture), which is closely related to Cubist painting, there is an original, far from imitative, approach to abstraction. The architects and painters of this period also interacted and fed from each other's works (paintings and architectural works). 'Introduction to The Project 1' lesson, which aims to establish the interaction between these two important disciplines and to achieve a concrete result product, has been carried out in the design studio by Piet Mondrian, one of the most important figures of the De Stijl movement, and has evolved from two dimensions (painting) to three dimensions (architectural model).

In the study, at the Department of Interior Architecture and Environmental Design, Biruni University, 2019–2020 academic fall semester 1. in the scope of "Introduction to Project 1" lesson, students' studies/practices under the direction of two faculty members are discussed. The stages of the practices covering a four-week period in the 'Introduction to Project 1' studio are as follows.

4.1. First stage: two-dimensional studies

- Each student selected one of the works belonging to Piet Mondrian that the important name of the De Stijl movement (Pictures 1–4),
- He/she brought his/hers chosen work as black-and-white output in A4 size,
- She/he drew the same work by proportioning it to fit 35 × 50 cm Canson paper by looking at the A4 size work,
- While the lessons are going on, various guided art trips have been carried out in order to improve the students' perspective and to ensure their creativity with their design power (Mimar Sinan Fine Arts University Painting and Sculpture Museum within the scope of the 16th Istanbul Biennial and Pera Museumi, Arter Istanbul) (Pictures 5 and 6).



Pictures 1–4. From PietMondrian works (URL 1, URL 2)

Picture 5. Biruni Unıversity, from the Interior Architecture and Environmental Design Department art trips. Source:Terece (2019)

Picture 6. Biruni Unıversity, from the Interior Architecture and Environmental Design Department art trips. Source: Terece (2019)

4.2. Second stage: three-dimensional studies

- Based on the original of Mondrian's work, which was drawn in 35 × 50 cm dimensions, she/he created model materials for use in selected areas and cubes of the desired size, rectangular prisms.
- It has been transformed into a unique three-dimensional new study with different heights Using the concepts of ratio-proportion, scale, balance, together with the auxiliary elements created such as cubes, rectangular prisms and rods (horizontal-vertical bearing element to be used as) (Picture 7).

Picture 7. Biruni Unıversity, Department of Interior Architecture and Environmental Design, 'Introduction to the Project I' lesson studio studies. Source: Terece (2019)

4.3. Third stage: two-dimensional drawings of three-dimensional studies

- She/he has drawn the top, front-back and right-left side facades on 35 × 50 cm sized Canson paper with one-to-one dimensions by looking at the resulting three-dimensional studies.
- Consequently, she/he has handed in is the three-dimensional design and five facades that belong to it (top, front-back and right-left side facade), (Pictures 8 and 9).

4.4. Result products

The process was completed with two-dimensional studies as the first stage, three-dimensional studies as the second stage and two-dimensional drawings of the third and last stage, as three-dimensional works. The resulting products of some students whose names are mentioned are as follows:

5. Conclusion and evaluation

General gains obtained as a result of studies covering a certain process are as follows:

- Studios are suitable environments for a customisable knowledge creation process, which Schön describes as a different and design-specific way of knowing, where learning can take place while doing (Schon, 1985).
- The design studio is a free working environment independent of the education system based on memorisation and repetition, allowing students to think flexibly, gaining creativity, adding different perspectives and improving perception skills.

Picture 8. Resulting student studies

Picture 9. Resulting student studies

- The students of the interior architecture department, which are intertwined with different disciplines, should have the competencies to examine and solve the given design problem with a versatile and critical perspective. Students gained self-confidence in their first studio experiences within the scope of “Introduction to Project 1” lesson in which these

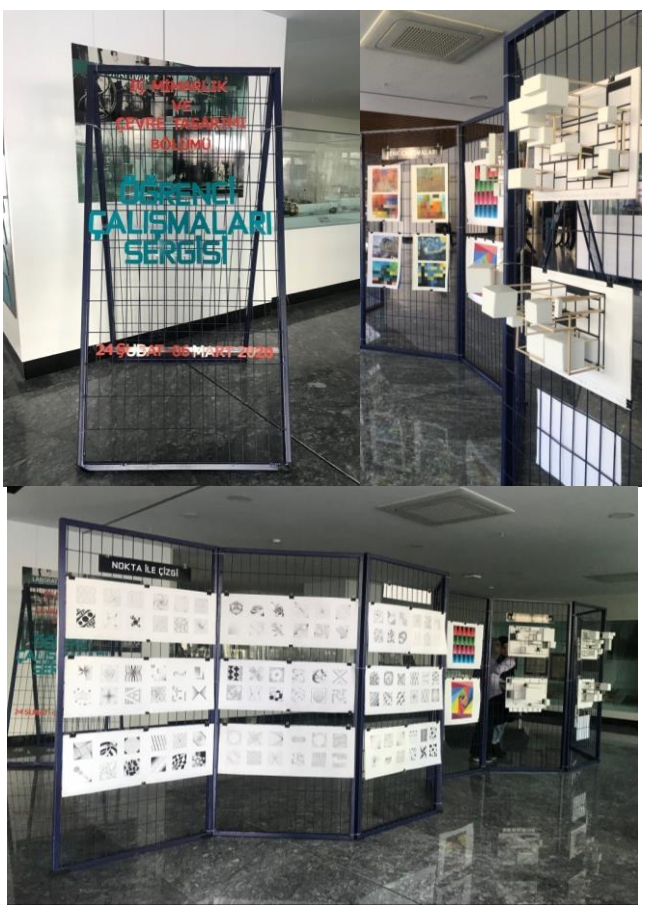
competencies were tried to be gained, without staying within certain limits with their original design approach.

- Design includes cognitive processes related to research, concept development, criticising, analysis and evaluation. Versatility in design is the effort to reveal the previously unthinkable, approaching problem solving from a different perspective, establishing a relationship between thoughts and reflecting on the design (Uzunarslan & Polatkan, 2011). In order to put forward a different design by looking at the versatile, students have experienced an instructive process in which they can establish relationships between thoughts, interpret them, are not afraid of experimenting and obtain successful results with aesthetic perception in their studio work.
- Students grasped the importance of experiencing learning by seeing, creating alternative solutions with the trial-and-error method, and expressing visually in their studio work. In this sense, it has been seen that the adoption of experience/experience in design education studios as a 'sine qua non' basic practice will greatly contribute to the development of the student both during and after the education.

The gains obtained as a result of the studies carried out with the Block problem method in the design studio of 'Introduction to Project 1' lesson are as follows:

- It supports the transformation of a pictorial composition in a two-dimensional plan plane into three-dimensional geometric forms and transforming these parts into characteristic design elements by stripping them of their pictorial qualities (Caragonne, 1995; Erbay et al., 2013; Hejduk, 1999). A certain amount of success has been achieved in the studies conducted within the scope of the 'Introduction to the Project 1' course studio.
- Creating a new and different composition from the existing one with ratio and proportion, scale, balance, harmony, fullness, space, movement and form is considered as the basic element of the study. In this direction, the students obtained a useful studio experience in which they could draw and convey what they saw with the concepts of ratio, proportion, scale, perception and where they were both physically and mentally involved, in which their hand skills developed.
- Features such as the cubes and rectangular prisms created in the study provide fluent movement on each other, and the auxiliary rods used in horizontal and vertical and structural axes played an important role in the formation of the composition. In this formation, different studies have emerged with reduction – subtraction, overlap – side-by-side insertion (experimenting and learning stage).
- San collected the standards for arts education in five items, based on the US National Association for Arts Education publication, and the fourth item is as follows: Students should be informed and introduced with sample artworks from various cultures and different historical periods. Therefore, students should be in a position to understand what kind of intercultural historical development different art disciplines have gone through in a general whole (San, 1999). The students, who had to start by looking at a certain work of art, first made a research on the subject and learned about the De Stijl movement. Then, each of them made interdisciplinary studies with their newly created two-dimensional drawings with different perspectives and applications that transform into three-dimensional forms, based on their chosen Piet Mondrian work (the best works that reflect the current). Therefore, it was seen that they also grasped the relationship between interior architecture and art movements.
- Design is a concept that changes and transforms frequently. The students observed, from the beginning to the end of the gradual process, how the design changed over time, developed as it changed and transformed with it. Because, as Jormakka (2010) points out, design is based on the creative power of the person on the one hand, and on the other hand, it depends on methodological rules that reflect the basic approaches and processes.

- Students' two- and three-dimensional thinking, perception, expression and application skills were developed. In other words, intellectual activity has been transformed into a concrete form by experiencing and using visual expression methods to present this thought.
- Our visual perceptions create the most lasting effect among our overall perceptions in the process of interacting with the environment at a rate of 80% (Seylan, 2019). In addition, according to Mattisse: "creativity begins with seeing". Lowry emphasises that seeing is a behaviour that can be learned, but it can only be achieved through efforts, and that the real seeing can be through the work of the eye and the mind (Lowry, 1972). In the studio work, a creative thought has been transformed into three-dimensional forms in order to express it visually, and thus it is possible to say that visual learning contributes.
- Design education studios enable students who do not have a design basis to gain competencies such as experimenting, examining, observing, discovering creativity and directing it. For this purpose, as a result of the 'Introduction to Project 1' lesson design studio, it has been observed that students can express themselves in different ways by creating innovative, free, original and creative end products.
- Students' perception and application capacities have increased with the individual creative approaches that emerged with the trial-and-error method applied to teach and develop creativity, which has an important place in design education.
- The final products of the 'Introduction to the Project 1' lesson design studio were exhibited at the student works exhibition of the Department of Interior Architecture and Environmental Design at Biruni University in the fall semester of 2019–2020 (Pictures 10–12).



Picture 10–12. Biruni University's Department of Interior Architecture and Environmental Design 2019–2020 Fall Century student work exhibition. Source: Terece (2020).

Michael proposes eight criteria, one of which is not superior to the other, and priorities for each student can be changed, which may be important in assessing creativity. The eight criteria are:

1. Sensitivity: Being aware of the sensory, environmental and aesthetic/creative problems.
2. Fluency: The ability to quickly notice the relationships between things and situations, to think quickly and to visualise. Respond quickly to stimulation.
3. Flexibility: The ability to adapt to new developments and changing situations inside or outside.
4. Originality: To give an individual response to stimuli in an uncommon, unusual way.
5. Solve (analysis): The ability to draw detailed conclusions from a whole.
6. Synthesis: The ability to take many elements and extract a meaningful whole from them. This involves an analytical process. There is synthesis in every artistic activity as it combines lines, colours and forms as a new whole.
7. Attaching new meanings: Using different things for their own purposes outside of their function.
8. Consistent Organisation: Harmonious integrity of parts, content, everything (Michael, 1983).

Based on these eight criteria, as a result of the studies carried out in the design studio of the 'Introduction to the Project 1' lesson discussed in this article, it has been observed that the process of adapting to the criteria of fluency, that is, the ability to respond quickly to stimuli and flexibility and to adapt to changing situations, has taken time. To make up for this deficiency, in future studies, it is recommended to improve students' skills in practising the same, similar and different applications, noticing quickly, thinking quickly and adapting to new developments.

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