



Basic Design and Visual Perception in Landscape Architecture Education

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Abstract: Basic Design, which is a mass course, is given in the first semester of undergraduate education of design professional disciplines. The aim of the course is to teach the students design elements and principles in case of two and three dimensional studies within the scope of basic design theory and to teach their usage through application exercises and to develop the skills of students in this field. This study was carried out in the fall semester of 2016 - 2017 academic year with the participation of first grade students of Department of Landscape Architecture of Ankara University Faculty of Agriculture. At the final stage, contribution of the basic design course to the visual perceptions of students was measured and discussed based on the evaluation of two observations, before and after completing the course study.

Keywords: Basic design, design education, landscape architecture, visual perception.

Peyzaj Mimarlığı Eğitiminde Temel Tasarım ve Görsel Algı

Öz: Tasarım meslek disiplinlerinin lisans eğitimlerinin birinci yarısında Temel Tasarım Dersi verilmektedir. Dersin amacı, öğrencilere temel tasarım teorisi kapsamında tasarım elemanları ve ilkelerini iki ve üç boyutlu örnek çalışmalar ile tartışarak kullanımlarının uygulama çalışmaları aracılığıyla öğretilmesi ve öğrencilerin bu

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konudaki yeteneklerinin geliştirilmesidir. Bu çalışma 2016 – 2017 eğitim öğretim yılının güz döneminde, Ankara Üniversitesi Ziraat Fakültesi Peyzaj Mimarlığı Bölümü birinci sınıf öğrencileri A grubunun katılımı ile gerçekleştirilmiştir. Dersi almadan dönemin başında ve dersi aldıktan sonra olmak üzere iki gözlemin değerlendirilmesine dayandırılarak geliştirilen yöntem ile temel tasarım dersinin öğrencilerin görsel algıları üzerindeki etkileri ölçülmüş ve yorumlanmıştır.

Anahtar Kelimeler: Temel tasarım, görsel algı, peyzaj mimarlığı, tasarım eğitimi.

Introduction

The design is a plan and idea developed for the solution of any problem and includes shaping dynamics. The design, which contains abstract based multi-faceted inputs, is carried out by certain principles, regardless of scale, theme, subject as a phenomenon encountered in every aspect of life. The basic design is a set of rules and principles that constitute the basis for design, which is also related to all design profession disciplines and living spaces. The basic design is the guiding principle in the process of converting abstract values into concrete design objects, and a set of regulatory principles for putting the design into a system (Erdoğan and Çelik, 2015).

The perception that occurs with the combination of various functions of the mind is a complex event and enables individuals to learn about and benefit from their environment. Perception is an important mind study in which a sense of momentum is used to stimulate and combine images stored in the past. Perceptions varying according to individuals who have similarities with standard or established conceptual cases, while they are similar to different and special cases and different and special cases are subject to change. Perception is the interpretation of a situation, not as real. Most of the time, individuals perceive what they want to see in accordance with their selective perceptions. In other words, perception is a phenomenon that changes according to the individual (Erdoğan and Çelik, 2015).

Perception can be sensory as well as visual. All the senses and the functioning of the perception of integral work in the basic design studies are mainly visual. Individuals obtain information about events, facts and concepts in their environment through perception. Perceptions are created through sensations and are the process of acquiring information. It is a way for individuals to understand and realise process based on to organise their environment and regulate sensory information. Individuals, based on their perceptual qualities, make sense for themselves at the end of the process of perceiving the stimuli they acquire from their environment (Siegel, 2006; Smith, 2002). Perception is an identification process associated with the person and the factors surrounding him/her, as well as physical stimuli that individuals create through sensations. The most critical factor in the detection process is the individual. Individuals can demonstrate different perceptual qualities of the same perceived concept. This is due to selective attention, selective perceptual parameters and selective perceptual retention in the process of perception (Kotler, 2001). Nevertheless, the calm and wide water surfaces are the areas that provide calmness in the urban design and which give depth to the landscape by bringing it to the third

dimension (Tülek and Barış, 2015). Some objects have the same effect on individuals like water and green volumes.

Visual perception comes into prominence in the design of instructional contents in perceptual processes, and visual perception approaches have an intense impact on design processes. Visual perception includes a variety of approaches such as selection, regulation, definition through sensory discrimination within the framework of visual characteristics (Behrens, 1984; Hochberg, 1978). In other words, visual perception is the process of recognising concepts for individuals (Messaris, 1994). According to Gal and Linchevski (2010), the visual perception is defined as the process of perceiving and registering visual information from sensory and mental processes.

One of the aims of the basic design studies is to ensure the formation of common denominators for the designers despite the different perceptions and approaches. In this context, the basic design is the way to use design components, pieces of the whole, 2D or 3D design ingredients in order regarding visual perception and integrity. That geometric forms, colour, texture, line, etc. along with design principles are essential and shape the way to create design objects.

As in many design professional disciplines, in Ankara University Faculty of Agriculture, Landscape Architecture Department, Basic Design Course is given in the first semester of undergraduate education. The aim of the course is to teach the students of the department of landscape architecture by using two and three-dimensional case studies within the scope of basic design theory and developing their skills in this subject. In addition to this, geometric forms, planes and volumes within the range of visual perception skills to move to a higher level.

In this study, it was tried to prove the Basic Design Course's contribution to increasing visual perceptions of students, who had never taken any design course before, in Ankara University, Faculty of Agriculture, Department of Landscape Architecture. There were carried out two examinations at the beginning and end of the semester; and then, it is determined the contribution and effect of the course, clarified students' development in visual communication, analysing and decomposing geometric components, and visual perception improvement.

Materials and Methods

The primary material of the study is the literature review about the subject and the findings obtained from the two-stage visual perception test applied to first-year students taking Basic Design course in the Department of Landscape Architecture of the Faculty of Agriculture at Ankara University.

The methodology created in the research has three stages. In the first stage, research has been done about how can be measured individual visual perception, interviews with experts about how to design such a test and evaluate in graphic design fields. Two tests have been done with students in the beginning and at the end of the semester, before and after they complete the lecture, to determine how correctly they perceive line, geometry,

colour, form, shape, direction etc. In this context, visual perception development, change and transformation of students were determined. In the last stage, these evaluations are interpreted and the basic design course, visual perception and design theories and principles of the use of forms, levels, effects, contributions and developments have been revealed.

For the research findings to be evaluated healthily, it was considered as a prerequisite for all students to have similar characteristics.

In order for the research findings to be evaluated in a healthy manner, it was considered as a prerequisite for all students to have similar characteristics.

- No colour blind,
- The lack of advanced myopia, hypermetropia or astigmatism,
- Attending the basic design course for the first time,
- The conditions for having previously not received any training for plastic arts (painting, sculpture, graphic design, etc.) have been observed.

Some of the students who participated in the first observation due to individual reasons could not participate in the second observation; therefore, the study was conducted and evaluated in the context of students who could participate in both two observations.

Three different images with different designs were created using some isosceles right triangle in a 10x10 unit square. The students were asked to transfer the projected images to the wall as they see on the A4 size paper with 10x10 unit square.

In this study, as a basic geometric form, an isosceles right triangle is chosen. Because, as a clearly perceived geometric form, it is possible to create different geometric forms such as square, rectangular, parallelogram and upright trapezoid, more variations than other basic geometric forms. Thus, both the ability to perceive / to be able to perceive geometric forms and their ability to distinguish and transfer new forms derived from the integration of these forms were evaluated.

In each section, 22 isosceles right triangles and basic geometric forms that created with them has been used.

The characteristics of the three images that students are asked to transfer are as follows:

- Black triangular isosceles right triangles are used in the first sheet. Incidental geometric forms and a non-ordering sample were presented without any symmetry or order. This colourless sheet is intending to measure students' attention of the place of triangles, analysing different composition made up by triangles, and symmetrical perception, which is not exist in this sheet.
- In the second sheet, isosceles right triangles consisting of only the main / primary colours (red, blue, yellow) are used. In contrast to the first map, a sample with a symmetrical layout in the second sheet is provided. Main colours are easier to perceive, though. So, students are expected to place correct triangles with correct colours in their blank sheet with observing rigid symmetry in this sheet.

- In the third sheet, main / primary and intermediate colours (red, orange, yellow, green, blue, purple) are used. Like the first sheet, it does not contain any symmetry or layout, but geometric forms and colour transitions are more difficult to detect and used together in close colours. Along with main colours, intermediate colours can make perception of the correct placement of the triangles harder. With this hardest sheet among these three, students are expected to navigate correct position of triangles in non-symmetrical order. To harden this sheet, close and opposite colours were used in an order to confuse students (Figure 1).

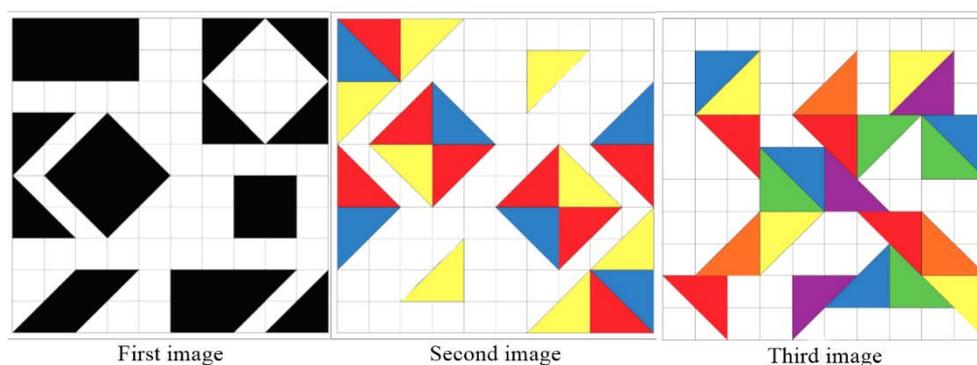


Figure 1. Designed images to measure visual perception (Original, 2017)

Criteria have been determined to count students successful on transferring images to the papers they are given.

- Students are given 10 minutes to transfer each images to their papers. During this time, students who could not complete the transfer of the image to paper were considered unsuccessful. The same test was conducted on the research assistants of Ankara University Faculty of Agriculture Department of Landscape Architecture and the duration of transferring the image to paper was determined as 4 minutes and 6 seconds on average. Therefore, 10 minutes given to students was determined as a suitable process.
- When transferring the isosceles right triangles on the paper, they were asked to fill the inside of the triangles with the colours in the image. Unfinished painting as scribbles was considered unsuccessful.
- Students who transfer wrongly the image on the paper were considered unsuccessful. In the case of incorrect transferring, two points have been taken into consideration:
 - Geometric shapes to be placed on the 10x10 unit square correctly,
 - The colours used in the second and third sheets were used correctly.

The first and second measurement were performed with the same methods. The only difference is that the images in the second measurement are formed by rotating the images used in the first measurement 90 ° to the

right or left. The number of isosceles right triangles used for each sheet, the geometric forms and colour scheme remained the same.

Various questions were asked to determine whether the students participating in the research successfully analysed the layouts. After the completion of the 10-minute process for transferring the images to the paper, a second 10-minute period was given time for questions. In this case, an observation lasted for 60 minutes. The geometric questions for each sheet have been the same. In addition to the geometric descriptions for the second and third sheets, the interpretation of the colours is also required. Questions asked in this context:

- How many isosceles right triangles, vertical edges are 2 units, used in this image at least?
- How many isosceles triangles have you seen that have a height of 2 units and a base of 4 units?
- How many equilateral triangles have you seen that have an edge 2 units long?
- How many squares are there with one edge is 2 units long?
- How many perpendicular trapezoids have you seen with a height of 2 units?
- How many parallelograms have you seen with a height and parallel edges of 2 units?
- How many rectangles have you seen that the short side 2 units long?
- Can it be claimed that there is a symmetrical order in all images?

Results and Discussion

In this section, the application of visual perception test applied to the students is explained, and the findings are discussed.

Transferring images to papers

Success in transferring images to the papers

First observation: The first observation was performed in the first week of 2016-2017 academic year fall semester. 23 students in 10 minutes;

- 14 students were able to correctly transfer the first image.
- 17 students were able to correctly transfer the second image
- 13 students were able to correctly transfer the third image.

Second observation: The second observation was held at the end of the fall semester of 2016 - 2017 academic year. 23 students in 10 minutes;

- 21 students were able to correctly transfer the first image.
- 22 students were able to correctly transfer the second image
- 19 students were able to correctly transfer the third image.

Development status: 14 people were successful at both in first and second observations, transferring the first image to the paper in time. While 7 people were not successful in the first observation, they were successful in the second observation. One person was successful in the first observation and failed in the second observation.

In the first observation, 14 of 23 people succeeded in transferring the first sheet while this number increased to 21 in the second observation.

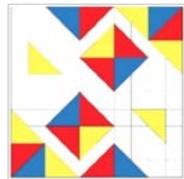
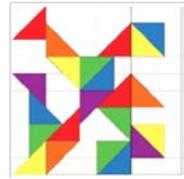
17 people were successful at both in first and second observations, transferring the second image to the paper in time. While 5 people were not successful in the first observation, they were successful in the second observation. One person was successful in the first observation and failed in the second observation.

In the first observation, 17 of 23 people succeeded in transferring the first sheet while this number increased to 22 in the second observation.

13 people were successful at both in first and second observations, transferring the second image to the paper in time. While 6 people were not successful in the first observation, they were successful in the second observation. One person was successful in the first observation and failed in the second observation.

In the first observation, 13 of 23 people succeeded in transferring the first sheet while this number increased to 19 in the second observation. Table 1 is prepared for easier and systematic detection of these results.

Table 1. First and second observation records and development status (Original, 2017)

Images	First Observation		Second Observation		Development
	Successful	Failed	Successful	Failed	
First image 	14	9	21	2	7
Second image 	17	5	22	1	5
Third image 	13	10	19	4	6

Individual Development of Students: The numbers given in Table 1 are the data obtained by the evaluation of 23 people together. However, when we look at the individual development of the students, the findings that can be evaluated from different perspectives were also reached.

- *Determinations related to colours:* At the first observation, 6 people were unsuccessful in the transfer of the first sheet and were successful in transferring the second sheet. Since only black isosceles right triangles are used in the first sheet, the spatial integrity of the geometric forms may be misinterpreted or interpreted differently. The triangles were easier to distinguish in the second image. Because, In the second sheet, two or more triangles of the same colour have been used side by side, separately, with each of the isosceles right triangles having one of the primary colours. The participation of primary colours in design and evaluation facilitated the perception of forms.

At the first observation, 7 people succeeded in transferring the second image and failed to transfer the third image. The second image uses only the primary colours (yellow, red, blue), the main and intermediate colours (red, orange, yellow, green, blue, purple) are used in the third image. In addition to increasing the number of colours, close colours in the third sheet are generally used together to form a boundary to each other. Thus, the detection of the third sheet was made more difficult than the second sheet.

- *Determinations related to geometric forms:* In most of the students who transferred the second image properly, errors in the first and third images, and different perceptions were observed. The isosceles right triangles in the second image have a solid symmetry in terms of both colours and positions. This situation, which is not present in the first and third sheets, facilitated the perception of the second sheet.

Answers to the questions about the images

As it is seen in the material and method section, the aim is to show how much students recognize and define the basic geometric forms. A student who has completed his/her high school education has to recognize basic geometric forms such as isosceles right triangle, equilateral triangle, square, perpendicular trapezoid, parallelogram and rectangle.

In the question about the interpretation of colours in the second and third image, students were expected to be familiar with the main and intermediate colours and to be able to interpret how hot and cold colours were used correctly. The main answer for the second image is that the main colours are used and in the third image, the main and intermediate colours are used together according to their characters as hot and cold colours.

Answers to the questions about geometric forms

For both observations, 8 questions were asked to each student.

First observation: The mean accuracy values of the answers given to all three images in the first observation are as follows:

- The average of the correct responses in the first image is approximately 27.7%,
- The average of the correct responses in the second image is approximately 60.1%,

- The average of the correct responses in the third image is approximately 40.2%.

Second observation: The mean accuracy values of the answers given to all three images in the second observation are as follows:

- The average of the correct responses in the first image is approximately 38%,
- The average of the correct responses in the second image is approximately 69.5%,
- The average of the correct responses in the third image is approximately 52.1%.

When the answers of the geometric analysis questions about the layouts were examined, the correct answers given in the second observation increased compared to the first observation. As can be seen from the correct answers, the second image was the most clearly understood layout. Because there is a solid symmetry and only the primary colours are used, it is easier to detect than the other sheets.

Questions about colours

As stated in the method, the students were asked to interpret the colours for the second and third images.

- In the first observation, 11 people interpreted the colour scheme in the second sheet correctly, and this number increased to 22 in the second observation.
- In the first observation, 6 people interpreted the colour scheme in the third sheet correctly, and this number increased significantly to 19 in the second observation.

It is seen that the success level of the students is higher because only the primary colours are used in the second image. It is thought that the use of main and intermediate colours used in the third image by grouping according to their proximity to each other increases the error rate of the students.

Conclusion

As a result of this study, it is obviously seen that students correctly and easily perceive geometrical shapes, forms, and the final design works created with basic design principles visually. It is seen that they can recognize and use the geometric form features, and they can easily perceive both the two-dimensional and three-dimensional design studies created by different geometric forms. In addition, students may have different selective perceptions in line with their own interests, talents and expectations, but they have used them more effectively in design details or in thematic designs. Different knowledge, experience and social / cultural perspectives might have played an important role in perception.

Regardless of whether one's a designer or not, it has been confirmed that order and symmetry are always a design principle that provides more accurate and clear perception in individuals. Symmetry has a facilitating effect on visual perception. In this respect, the perception and transfer of the symmetrical layout are successful and easier without any design training.

The use of different colours in design studies has the effect of facilitating perception in form and in geometry as well as in the third dimension when compared to black-white usage. It has been observed that the use of a combination of lean or similar colours, which make the perception difficult, developed and strengthened the perception of the students who have received basic design education and their ability to differentiate.

The primary colours are easier to perceive, and the impact on individuals is more pronounced and clearer.

While primary colors can be perceived and defined more clearly, there may be different perceptions in intermediate colors according to individuals. These different perceptions also affect the perception of geometrical forms. Basic design studies as an act of converting abstract inputs into two or three-dimensional concrete geometric formations contribute to the development of abilities such as better understanding, perception, correct use, association and composition of geometric form in individuals' / landscape architecture department students. Besides, it creates selectivity in visual perception in individuals; in this direction, it was found that they helped to perceive areas, forms and volumes more accurately both in the second and third dimensions, and they were able to relate geometric forms visually more accurately.

Basic design education has created significant differences for students perceiving geometrical forms, colours and definitions.

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