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Development of Design in Landscape Architecture Education

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Abstract

The study aims to contribute to professional disciplines and literature through the design approach in visual arts-based education, especially architectural education. Visual perception is important in the design process. However, in professions related to architecture, design, and art, the perception selectivity of people should be developed and well-prepared products should be offered to users. The research aims to determine how perception theory changes depending on the education students receive. Visual quality analysis, which forms the basis of our study, was used to determine how effective perception management is, which is important for landscape architecture students and in many visual arts branches such as painting, sculpture, and stage design. In the study, students of all courses were asked to evaluate different planting designs implemented in a single structural project simultaneously, based on the basic five design principles. The data taken based on a visual survey was analyzed with Chi-Square and Frequency Analyses in the Social Sciences Program Statistical Package and examined whether the design courses taken by the students for 4 years were related to their visual perception experiences. To the analyses, it has been determined that there are differences between first-year and final-year students in their interpretation of these principles, that the education received enriches the student's visual production area, and that the use of technology in design also contributes greatly. As a result, it was revealed that the needs of the students in their landscaping arrangements and designs both practical and theoretical education should be updated according to the student's interests and skills. Thus, the contributions of visual perception in landscape education in analyzing, appreciating, and creating visually interesting and functional landscapes will be discussed, and suggestions will be offered to improve their education and designs in their future professional lives.

Keywords: *Design principles, Landscape architecture, Visual perception, Visual skills, SPSS.*

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INTRODUCTION

Studies on the concept and methods of design began in the 1950s and 1960s (Jones 1992; Le Masson and Weil 2013). Concepts related to design have emerged over time as different ideas, theories, and theories about the concept of design (Cross 1993; Akdemir 2017). With the effect of factors such as logic, intelligence, and talent in the design process, the paths followed during the design phase have been defined in different ways. Throughout the history of the design process, the form approach has been interpreted with factors such as psychological, sociological, and religious (Norman 2017; Acırlı and Kandemir 2020). It is especially important to present sustainable environmental designs that will improve environmental conditions (Coccolo et al. 2018). In this context, one of the most important occupational groups dealing with sustainable environmental design and focusing on working subjects is the professional discipline of landscape architecture. Landscape architects should ensure that the design and planning studies they focus on meet important needs such as the demands of the users, the comfort of the space to be created, and active/passive usage conditions (Onur 2009; Doğan 2019, Soydan 2020). It is seen that the concept of visual perception, one of the most important parameters of landscape architecture studies, stands out in designs (Daniel 2001; Polat et al. 2012). The constant change of environmental conditions and the necessity of living in harmony with these conditions; require recognition of objects and perception of the environment to meet individual needs. For this reason, the concept of perception is very important for human life (Aydınlı 1986; Barness and Papaelias 2021). While the integrity of space and perception is ensured by the integrity of the width-height-depth 3-dimensional object criteria, the 4th dimension which is time is very important for these studies.

Landscapes that change over time e.g. plant growth, flowering, fruiting, etc. Temporal concepts such as the change of seasons allow the perception to change in the same space (Aslan et al. 2014). The concepts of perception and sense should not be confused with each other. While the sense expresses the data that we feel with our sense organs but is not yet defined; perception can be defined as the process of making sense of the existence and events around us by interpreting sensory data (Cüceloğlu 1991). According to Genç and Sipahioğlu (1990), perception is the phenomenon that gives us identity information about the qualities of objects, and the mind has nothing to think about without materials that will create perception. Myers (1989), on the other hand, defines perception as the awareness of an object or situation with the help of the senses by focusing attention on a phenomenon or object. Perception is the interpretation and comprehension of information about the world around us gathered by sense organs. According to some, perception is what the stimuli coming from the external environment are collected by the senses, while according to some people, it includes all kinds of information that can be obtained in a situation belonging to the outside

DOI: 10.15320/ICONARP.2025.324

world (Katırancı 2014). Perceptions are fed by three sources such as experience, biological structure, and knowledge (Myers 1989; Van Jaarsveld 2010). According to Arnheim (2012), visual perception can be evaluated by looking at the presence of a small object or the effect of its location on the visual environment. Visual perception structures the interaction between the perceived and the perceiving individual according to some visual stimuli (Behrens 1984). The sense of aesthetics resulting from perception is the order created by the harmony of nature and the sense of satisfaction that this order creates in the user. In landscape aesthetics, this perception can be defined as the feeling that the whole landscape creates in the person. The whole formed by the elements that make up the landscape strengthens the visual perception. The philosophy created by the evaluation of visual perception must be associated with design (Beyoğlu 2015). The beauty of the landscape consists of the perception that the whole creates in the user, rather than individual elements (Beza 2010). The concept of beauty is the user's sense of satisfaction (Richard et al. 1990). In the perception process, many factors enable the perception of the individual in the environment. The natural and socio-cultural environment of the individual affects the perception process (Kotler 2016). Although the perception depends on the personality and culture of the user, the visual features that make up the landscape are also important (Bishop et al. 2001). The criteria of the factors that make up the landscape affect the aesthetic quality of the space and increase the satisfaction of the user. The way the geometric features that make up the form of the space are brought together increases the aesthetic quality (Lang 1988). Understanding human perception and quantitative parameters that characterize the visual quality of the landscape in urban open green spaces is important to identify these links (Ma et al. 2021). While designing, determining the visual perception qualities of individuals will ensure that the design is made for the solution of the problems. (Smeulders et al. 2000). The design criteria and elements constitute the perception in the visual perception process (Eidenberger 2004). Basic elements such as form, texture, size, light, etc are formed by bringing together factors such as harmony, repetition, symmetry, unity, dominance, hierarchy, and balance with different relations (Wong, 1993; Wender and Roger 1995). Features such as order, repetition, rhythm, and form used in the design facilitate the user's perception of the environment and strengthen the perception (Yılmaz et al. 2018).

Improving the visual perception of architecture students during their education is essential for their development as skilled and innovative designers. Here are several strategies to enhance visual perception in architecture education:

- Visual Training Exercises: Incorporating regular visual training exercises into the curriculum. These exercises can include sketching, drawing, model making, and other hands-on activities that help students develop their observational skills and spatial awareness.

- Exposure to Diverse Architectural Styles: To expose students to a wide range of architectural styles, from historical to contemporary, through case studies, field trips, guest lectures, and architectural tours. This exposure helps broaden their visual vocabulary and allows them to analyze and appreciate different design approaches.
- Studio Critiques and Feedback: Conduct regular studio critiques where students present their design projects to peers and faculty for feedback. Encourage constructive criticism and discussions about visual composition, proportion, scale, and other elements of design.

This feedback loop helps students refine their visual perception and design skills over time.

- Integration of Technology: Integrating digital tools and software, such as computer-aided design (CAD), Building Information Modeling (BIM), and visualization software, into the curriculum. These tools allow students to explore and manipulate architectural forms in three dimensions, enhancing their spatial understanding and visualization abilities.
- Interdisciplinary Collaboration: To encourage interdisciplinary collaboration with other fields such as art, psychology, sociology, and environmental science. Collaborative projects provide students with diverse perspectives and insights, fostering a deeper understanding of the social, cultural, and environmental factors that influence architectural design.
- Study of Human Perception: Introducing students to the principles of human perception, including visual perception, cognitive psychology, and environmental psychology. Understanding how people perceive and experience space can inform design decisions and help students create more user-centered environments.
- Exploration of Materiality and Sensory Experience: To encourage students to explore the sensory aspects of architecture, including materiality, texture, light, and sound. Hands-on experiments with different materials and sensory simulations can deepen students' understanding of how design choices impact the human experience of space.

Encouragement of Creativity and Experimentation: Fostering a supportive environment that encourages creativity, experimentation, and risk-taking. Allow students the freedom to explore unconventional ideas and push the boundaries of traditional design concepts, promoting innovation and originality in their work. By incorporating these strategies into architecture education, institutions and universities can effectively enhance the visual perception of students, preparing them for successful careers as skilled and visionary architects (Efland 2002; Nolan 2009, Asl and Mizban 2016, Lisińska-Kuśnierz and Krupa 2020).

DOI: 10.15320/ICONARP.2025.324

The quality of design courses is determined by the suitability of design process factors to students' perception levels and how student perception is formed. It is also very important that the design principles of the spaces that people will use in common are realized according to the theories of visual perception. İpek (2003), emphasized that visual learning techniques in schools should be included in the design process as they facilitate learning. many perception theories affect the development of design such as Gestalt, computational, constructivist, and probabilistic perception theory in the design process. The design teaching technique takes place between two different approaches. The first of these approaches focuses on the development of student's abilities that will enable them to produce original ideas. The second approach, on the other hand, focused on the definition of form and the development of a critical view, concentrating on the professional discipline (Lizondo-Seville 2020). The theory of perception has a very important place in the development of this dual concept and concrete thinking ability (Erdem 1968; Minez 2013). Gestaltism, which emerged especially in the early 20th century, is a psychological theory that focuses on "perception" and "perceptual organization" within cognitive processes. Gestaltism tries to understand the underlying laws that enable us to have a meaningful perception in a seemingly chaotic world. At the same time, gestalt psychology is a mental management organization that directs the way we interpret visual perception based on design (Zanforlin 2004; Pinna 2013, Erdal 2006, Pinna 2013, Spagnuolo 2016, Guberman 2017, Hamlyn 2017, Mungan 2020, Sandal 2022). Also, Gestalt psychology suggests that we should not focus on every little component when trying to make sense of the environment we exist in.

The relationship between design and perception psychology is examined in depth and many ways. This theory, which examines how people perceive and organize visual information, also offers valuable principles that designers can apply in various design disciplines, including graphic design, industrial design, architecture, and more. In this way, individuals become aware of how they perceive visual elements and organize them into meaningful patterns and structures. Designers use this understanding to create layouts, compositions, and structures that are visually consistent and easy to understand. These people can arrange elements in a way that supports intuitive perception and understanding, considering factors such as proximity, similarity, continuity, and closure. In this way, they can better observe and analyze the environment they live in. They also use techniques such as contrast, scale, color, and typography to create focal points and hierarchy in a design. They manage to convey the hierarchy of information by directing the viewer's gaze by controlling the visual weight and emphasis on every living or inanimate element. On the other hand, it provides important information about how people perceive and interpret visual information, which can be applied to landscape design to create environments that are not only visually appealing but also functional, comfortable, and emotionally resonant

(Suman 2009; Stoica 2013, Zhao 2013, Kenaan 2015, Bondarko et al. 2023). By incorporating Gestalt and similar principles into their design processes, landscape designers can create outdoor spaces that delight the senses and enrich the human experience. In landscape design, this principle can be used to create designs that invite exploration and discovery. By strategically hiding or revealing certain elements, designers can create landscapes that capture the viewer's imagination and encourage them to explore more. To understand how people, perceive outdoor spaces and to make sense of them from a creative perspective, landscape designers arrange elements (Amorim et al.2009; Ahmad Nia and Atun 2016, Trebacz 2019, Heft 2021) such as plants, paths, and structures to create a harmonious and visually pleasing composition (Figure 1, Figure 2).

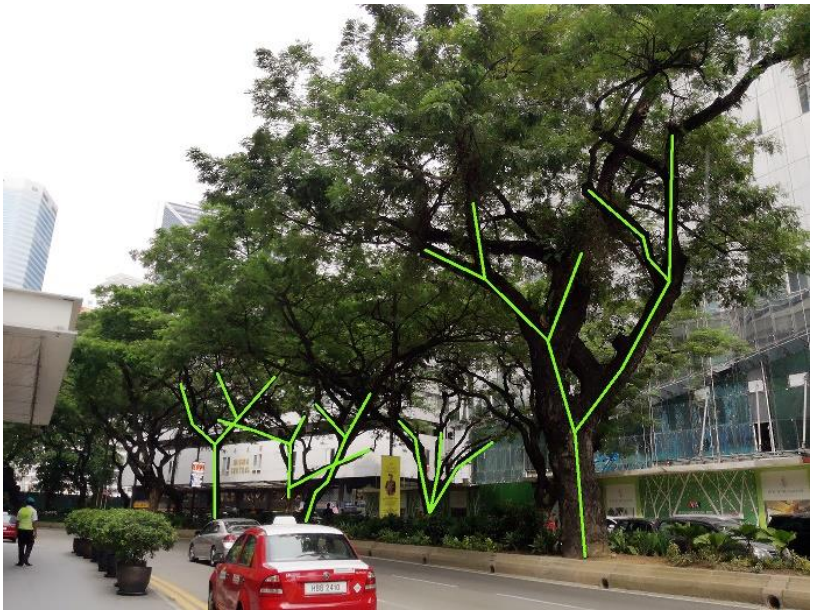

Figure 1. Unity - Continuity in Design (Original Photo).

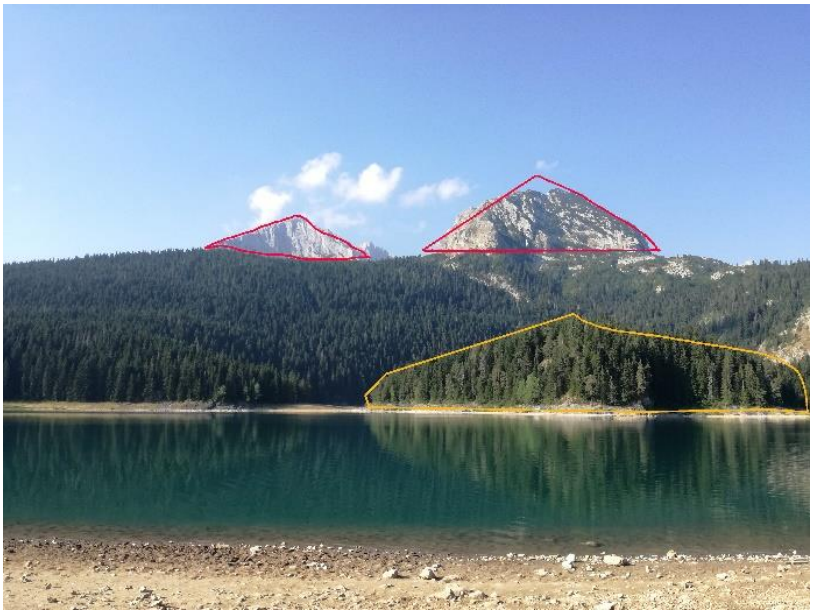

Figure 2. Shape ground - Harmony in Design (Original Photo).

DOI: 10.15320/ICONARP.2025.324

Considering that the individual is an integral part of the environment that exists in this design cycle and is concerned with needs, it can be said that design exists for human beings and human beings exist to design (Figure 3, Figure 4).

Figure 3. Repetition – Proximity in Design (Original Photo).

Figure 4. Balance-Closure in Design (Original Photo).

In short, the perception process is summarized as focusing on the target, creating concepts, and identifying shapes. In addition, in the process that creates the perception, it is possible to strengthen the perception by building a bridge between the past and the present. Elements and indicators in the visual perception process determine the quality of the perceived concept (Erişti & Urgun 2016). The factors below change for the person who perceives:

- Perceptual choices
- Interests and qualifications
- Trends around
- The space in which the perceived concept takes place and interacts
- It varies depending on the socio-cultural structure and environmental conditions.

ICONARP – Volume 13, Issue 1 / Published: 30.06.2025

The main purpose of this study is to examine the perception change of the individual in the landscape architecture education process. The main elements of this study are the source researches on the subject, the questionnaire study to question the existing assumptions, and the determination of the approaches that can be effective in the future landscape architecture education of the findings obtained as a result of the research. The study, which was prepared with the assumption that perception change is possible in landscape architecture education, aimed to develop different strategies in education. As a result, the data to be formed in the light of the data obtained will reveal useful results for education and especially for the development of landscape architecture education. For this reason, this study, which was carried out in the Department of Landscape Architecture, was applied simultaneously in a holistic way to cover whole classes of the education program. Landscape Architecture students take design courses throughout the 4-year education period. These courses are increasing every year at different levels and scales. At the end of four years, they took all courses related to landscape design and completed their training. The courses students take regarding design are included in the curriculum as follows table 1.

Table 1. Design-related courses in landscape architecture to years.

Class	Courses
1st grade	Graphic design, Sketching and Drawing Technique
2nd grade	Basic Design, Landscape Design Studio I-II
3rd grade	Planting Design, Construction I-II, Landscape Design Studio III-IV

In parallel with the purpose of the study, some hypotheses were put forward for the study to determine the effect of design on visual perception in landscape architecture education.

H1: The quality and quantity of landscape architecture education affects the perception of design.

H2: As the number of design-related courses increases each year, students can read landscape designs more accurately at the end of 4 years.

RESEARCH METHOD

The study was carried out to determine how students of department of landscape architecture perceive visual perception theory techniques and landscape design principles. For this study, an existing area was chosen considering that it will be implemented by local governments in the future. A neighborhood park located in Erzurum Province Palandöken district, which currently has a children's playground operation, was preferred. In the landscape design shown to the students in the survey, the park was created with formal lines and includes a water surface, seating benches, shaded and semi-open spaces, and pavement details chosen in a way and color that will not interfere with the planting design. On the other hand, vegetal designs were created with tree and shrub combinations of varying size, density, variety, color and composition to

DOI: 10.15320/ICONARP.2025.324

attract the student's perception and attention. It is aimed to measure the functionality and aesthetic value of the design at the park scale, especially the effective use of color and contrast, as well as features such as texture and pattern diversity. In this direction, it will be possible to achieve a new landscape design approach for the park area as well as aesthetics and functionality (Figure 5). The method is based on correlating students' perceptions through visual quality analysis of planting on a single design according to the number and quality of design-related courses they take each year.

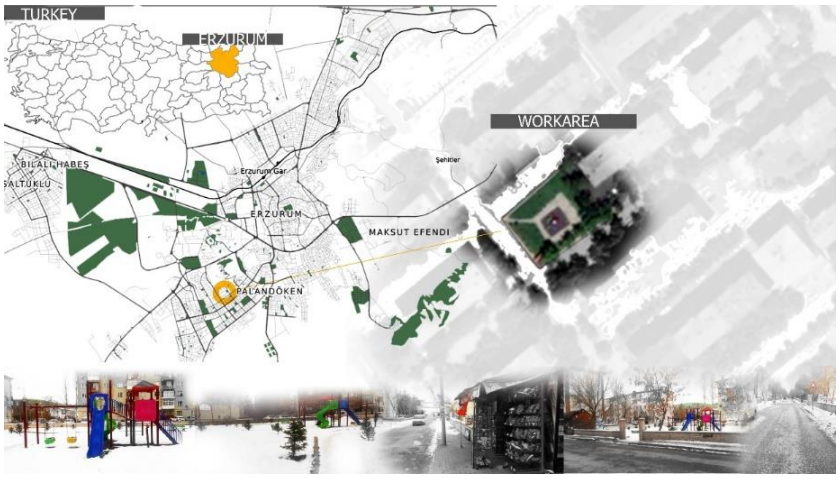

Figure 5. Location of the study area in Erzurum City Center.

The subject of the research is to determine whether the students of landscape architecture, in terms of image and concept selectivity differ according to the class they study, based on the idea that individuals' thinking abilities can be improved by visual perception or visual education.

Study includes:

- Deciding on the study area where the landscape design will be applied in the research,
- Conducting research in the field and scanning the relevant literature,
- Taking photos of the working area,
- Developing different alternatives to determine visual perception changes,
- Preparation and implementation of the survey questions containing the landscape design principles.

The study was conducted with the students of the landscape architecture department, consisting of 1-2-3 and 4th-grade students simultaneously to determine the dominant or most common element of the design principles "dominance, balance, unity, emphasis and repetition" in 5 different plant design projects on the same hardscape design. It is survey research that includes the evaluation of the groups randomly, on the plan, section, and three- dimensional project visuals of the area, and by allocating equal time to each visual in terms of design principles (Figure 6). 310 active students are studying in the department of landscape architecture. The sample size of the survey was calculated as 174 people according to simple random sampling in the Equation 1. (Baltacı 2018).

Equation 2. Sample size calculation formula

$$n = \frac{N.\sigma^2.Z\alpha}{(N-1).d^2}$$

n: Sample size, N: Number of universe units,
P: Observation rate of X in the universe,
Q (1-P): Rate of not observing X,
Zα : 1.96, 2.58, and 3.28 values for α= 0.05, 0.01, 0.001 d= Sampling error
The survey results were analyzed with Frequency analysis in SPSS, One Way ANOVA, and CHI-square tests.

Figure 6. A view from the moment of the survey conducted in the studio.

A few explanations and guidance were given to the students to evaluate these principles through the design.

- Dominance: Evaluating which of the elements you see in the botanical design is visually more dominant,
- Balance: Compliance of the design with different types of balance such as symmetry, asymmetry or radial and measuring the mass-void ratio,
- Unity: Pay attention to how different elements of the design are related to each other and brought together,

(For example, statements such as "If the landscape elements in the park are harmoniously brought together with the structural elements, this provides unity and integrity" were made).

- Emphasis: They were asked to indicate which elements in the design stand out and attract attention.

RESULTS

As a result of the survey, the rate of first-class participants was found to be 39%, while the rate of 4th-grade participants was found to be 29% (Figure 7). The rate of participation in the survey and class sizes vary.

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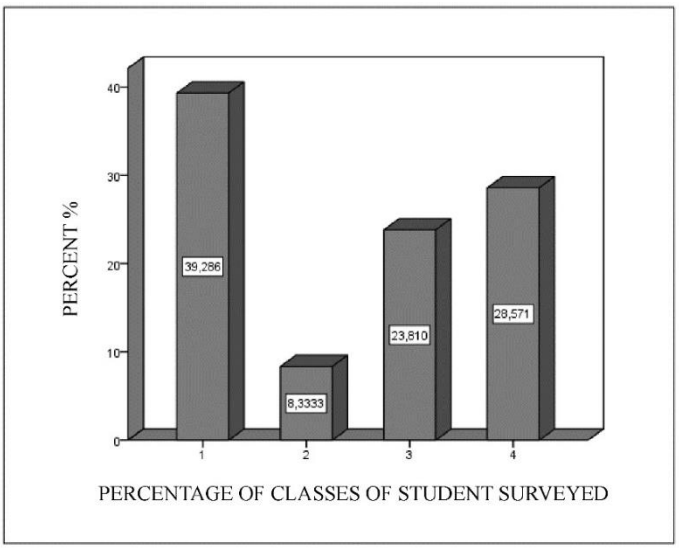

Figure 7. The overall percentage of students surveyed

For the first design project shown in the survey, visual evaluations of each class were expected (Figure 8). The first graders were 66 people during the survey, and they were asked to examine the plan, section, and three-dimensional perspectives of the design by the principles stated for the first design shown. The students stated that the principles of "unity and repetition" were mostly dominant in this arrangement. Sophomores, on the other hand, stated that they saw the principle of "unity" in the same design to a large extent (64%). While the majority of the third-year students stated that the principle of "repetition" was more pronounced, last year's students stated that the principle of "balance and unity" was perceived more (Table 2).

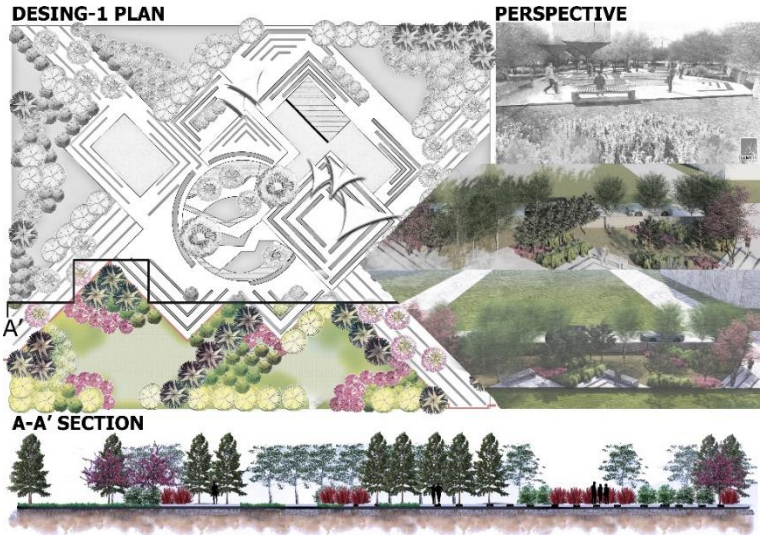

Figure 8. Design-I Plan, section, and three-dimensional views

Table 2. Student evaluation in terms of Design-I planting project design principles

Design-I	The first grader		Sophomore		Third grade		Fourth grade	
Principles	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %
Dominance	9	12.7	1	7.1	2	4.8	5	9.3
Balance	7	9.9	2	14.3	4	9.5	24	44.4
Unity	28	39.4	9	64.2	7	16.7	15	27.8
Emphasis	3	4.2	1	7.1	9	21,4	5	9,3

Repetition	19	26.8	1	7.1	18	42,9	5	9,3
Total	66	93.0	14	100.0	40	95.2	54	100,0

When the second design alternative was presented to the surveyed students (Figure 9), first-year students stated that they saw the principles of "dominance" in the first place and unity in the second place design. 50% of the second-year students stated that "balance", third-year students "balance and repetition" and senior students stated that "dominance" was the most dominant principle in design (Table 3).

Figure 9. Design-II Plan, section and three-dimensional views

Table 3. Student evaluation in terms of Design-II planting project design principles

Design-II	The firstgrader		Sophomore		Third grade		Fourth grade	
Principles	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %
Dominance	22	31.0	3	21.4	8	19.0	21	38.9
Balance	4	5.6	7	50.0	13	31.0	8	14.8
Unity	17	23.9	1	7.1	2	4.8	10	18.5
Emphasis	10	14.1	2	14,3	2	4,8	5	9.3
Repetition	13	18.3	1	7.1	15	35.7	10	18.5
Total	66	93.0	14	100.0	40	95.2	54	100.0

The visual questionnaire was asked of the students for the third plant design project (Figure 10). First-year students stated in the questionnaires that "emphasis and repetition", second-year students "emphasis", third-year "emphasis and repetition", and fourth-year "repetition" was more dominant at a rate of approximately 40% (Table 4).

DOI: 10.15320/ICONARP.2025.324

Figure 10. Design-III Plan, section and three-dimensional views

Table 4. Student evaluation in terms of Design-III planting project design principles

Design -III	The first grader		Sophomore		Third grade		Fourth grade	
Principles	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %
Dominance	7	9.5	2	14.3	4	9.5	6	11.1
Balance	4	9.5	3	21.4	4	9.5	7	13.0
Unity	17	11.9	2	14.3	5	11.9	8	14.8
Emphasis	10	21.4	4	28.6	9	21.4	11	20.4
Repetition	13	42.9	3	21.4	18	42.9	22	40.7
Total	51	95.2	14	100.0	40	95.2	54	100.0

Student evaluations were made on the visuals in terms of the principles stated regarding the fourth design shown to the students (Figure 11). Accordingly, first-year students stated that they mostly saw the principle of “balance and repetition” in the fourth design, second- year students mostly “repetition", the majority of the third-year students stated that they saw "repetition” and nearly 50% of the senior students stated that they saw the principle of “repetition” (Table 5).

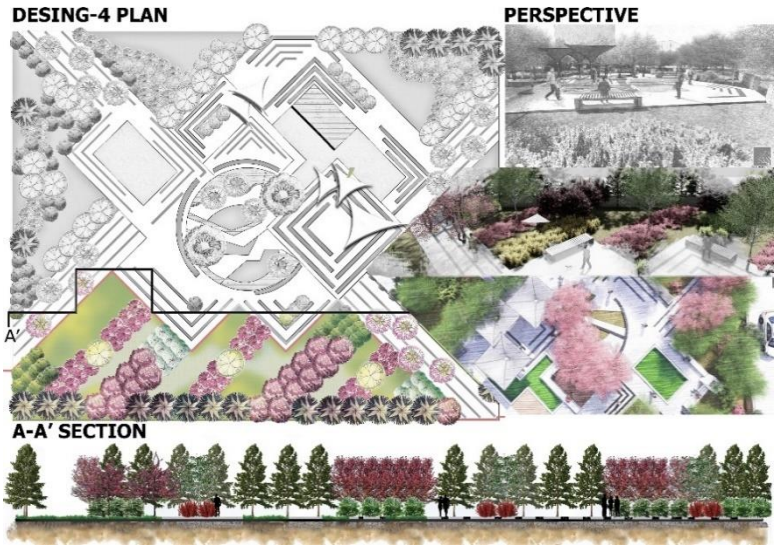

Figure 11. Design-IV Plan, section, and three-dimensional views

Table 5. Student evaluation in terms of Design-IV planting project design principles

Design-IV	The first grader		Sophomore		Third grade		Fourth grade	
Principles	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)
Dominance	7	9,9	3	21.4	5	11.9	4	7.4
Balance	25	35.2	2	14.3	4	9.5	12	22.2
Unity	5	7.0	2	14.3	7	16.7	5	9.3
Emphasis	10	14.1	1	7.1	7	16.7	4	7.4
Repetition	18	25.4	6	42.9	17	40.5	29	53.7
Total	65	91.5	14	100.0	40	95.2	54	100.0

Finally, the design principles asked about the fifth design prepared for the study area were evaluated (Figure 12). For this design, first-year students preferred "balance and unity" out of the five design principles, second-year students mostly (42%) "balance", third-year students "unity", and senior students in the fifth design. They stated that the principles of "balance and repetition" were dominant (Table 6).

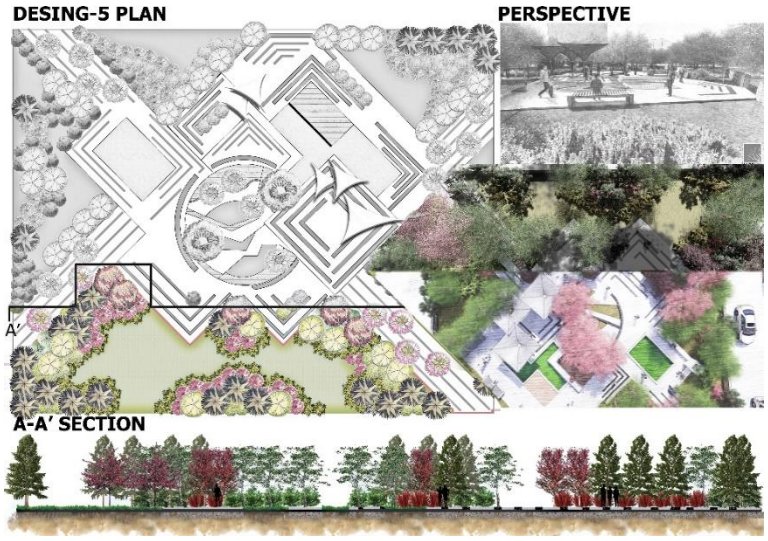

Figure 12. Design-V Plan, section, and three-dimensional views

Table 6. Student evaluation in terms of Design-V planting project design principles

Design-V	The first grader		Sophomore		Third grade		Fourth grade	
Principles	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)	Percent %	Number (N)
Dominance	9	12.7	3	21.4	7	16.7	5	9.3
Balance	19	26.8	6	42.9	5	11.9	21	38.9
Unity	32	45.1	2	14.3	17	40.5	9	16.7
Emphasis	6	8.5	1	7.1	6	14.3	6	11.1
Repetition	5	7.0	2	14.3	5	14.3	13	24.1
Total	71	100.0	14	100.0	40	97.6	54	100.0

The most important difference between people's learning status is the change they show in perception. The development of perception can be changed by identifying and directing people's abilities. The assumption

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that perception change changes during the education process have been confirmed by the examinations and analyses made. In his study, Katrancı (2017) also tried to determine different factors such as the student's area of interest, the time spent in the space, the type of intelligence and the extent to which the visual images were frequently encountered, and how much he adopts the space is important in the stages of noticing, understanding and comprehending the objects around in visual perception education. Alvino (1985), on the other hand, states that training in visual perception strengthens the right lobe of the brain. The study, it was aimed to systematize the concepts created in the perception of all students with designs made with different principles and to determine the technique they perceive in each design by taking these principles into account. Within the scope of the questionnaire, 5 different planting designs were asked to the students simultaneously on the same one hardscape design. As a result of the survey, different answers were found between the classes (Figure 13).

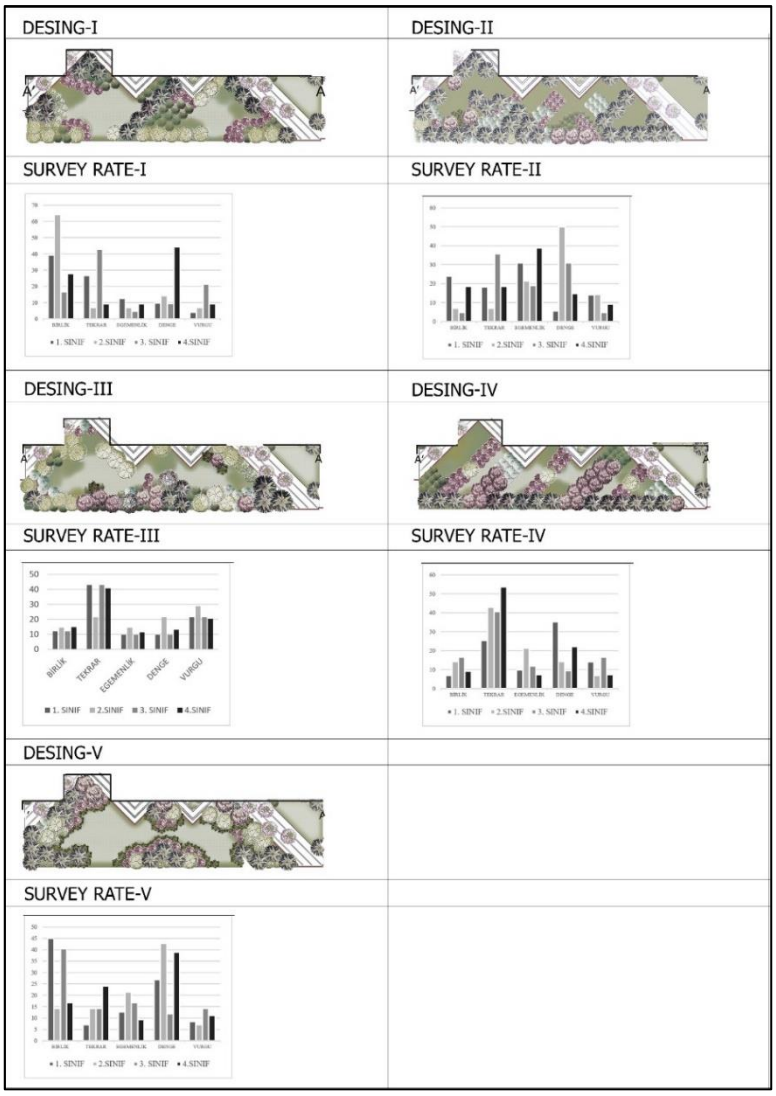

Figure 13. Comparison of the designs according to the perception change in the education.

In general, although the dominant principles perceived and observed in the design were partially similar in the evaluations of the students in each class, it was observed and analysed that there were serious differences in

ICONARP – Volume 13, Issue 1 / Published: 30.06.2025

some responses. First-year students learn design principles and design in two dimensions in the "basic design" course. In the third and fourth grades, they apply these principles in three dimensions in their project courses. This reveals that students' professional knowledge and experience affect their design interpretations. As a result, significant differences in perception in different classes on the same design were determined by Chi-Square analysis. According to analysis, it was determined that the student's perception of education differed in terms of balance, unity, and repetition principles, but did not change in other principles (Table7).

Table 7. Chi-square Analysis Table

Chi-Square Tests				
Pearson Chi-Square	The first grader	Sophomore	Third grade	Fourth grade
	Asymp. Sig. (2-sided)	Asymp. Sig. (2-sided)	Asymp. Sig. (2-sided)	Asymp. Sig. (2-sided)
Dominance	.870	.020	.093	.499
Balance	.002	.005	.357	.072
Unity	.000	.353	.013	.137
Emphasis	.335	.216	.472	.986
Repetition	.516	.135	.186	.093
a. 2 cells (25.0%) have an expected count of less than 5. The minimum expected count is 2.99 p≤0.005				

One Way ANOVA and Chi-square analyzes were conducted to determine which principles were most important and effective in the projects (Table 8). According to the One-way ANOVA test, it was found that the principle of “Dominance and Balance” is very important as the most meaningful design criterion in the submitted projects (sig ≤0.005).

Table 8. ANOVA Analysis Table

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Dominance	Between Groups	7.203	2	3.601	27.604	.000
	Within Groups	9.785	75	.130		
	Total	16.987	77			
Balance	Between Groups	8.851	3	2.950	23.902	.000
	Within Groups	11.479	93	.123		
	Total	20.330	96			

Chi-Square analyzes whether there is a relationship between students' evaluations of design principles according to their education level, the balance principle of the fifth design differs according to the grade level. First graders stated that the principle of balance was emphasized more. Therefore, it has been determined that the balance principle, one of the design principles, differs according to students (Table 9).

DOI: 10.15320/ICONARP.2025.324

Table 9. Chi-Square Analysis Table

Design-V	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.229a	3	.000
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.99.			

It has been determined that the principle of dominance is a more meaningful relationship in the first design among the designs shown to the students in the differences seen in the determination of the principles specified in the designs (Table 10).

Table 10. Chi-Square analysis Table

Design-I	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.072a	2	.000
a. 3 cells (50,0%) have an expected count of less than 5. The minimum expected count is 1.60.			

DISCUSSION

During this study in which Faculty of Architecture and Design, Landscape Architecture students participated, it has been observed that the final year students, who have received both theoretical and applied basic programs and training for landscape design and planning for 4 years, take more accurate and professional approaches when examining designs, especially than first-year students who have not yet mastered these training. Ercan (2009) aimed to determine the effect on the development of visual-motor coordination of students with and without visual perception training in a study he conducted. It has been determined that the prepared education program supports children's visual perception and motor coordination skills and is consistent with previous studies in this field. Considering this study, it has been concluded that visual perception has positive effects on students and that studies encouraging this education have increased. Therefore, the style and methods that will complement the creative processes of students are also important elements for the professional discipline of landscape architecture (Casakin & Timmeren Van 2015). It has been observed that the color used, and the formal perception of the plant representations have an important contribution to visual perception. In addition, as a result of the surveys conducted in the classrooms, it has been revealed that landscape architecture education affects visual perception. Especially since first-grade students have limited visual perception and knowledge of design, it is more difficult than third and fourth-grade students to use their imagination to read the forms and turn this abstract phase into a concrete process. To increase the perceptual development of students, besides various three-dimensional studies and model work by addressing visual perception theories, visual perception competitions between classes can be held to contribute to the development. Eken (2021), explains the project example of the gradual and applied expression of design elements and principles given within the scope of Basic Graphic Education course

within the scope of Basic Graphic Education course in the Faculty of Fine Arts Graphics Department curriculum. At the point where design workshops are insufficient in traditional landscape architecture education, 3D virtual world software is now used effectively in education (Gül 2011). In the study, it has been determined that students who have started to take architectural education for the first time may have insufficient design knowledge and thinking skills, and it has been determined that these students have difficulties in transforming the abstract process into concrete. In the digital time we live in, educators have started to share their knowledge and experiences in academic circles and on some platforms by using this software. These developments create suitable environments for students to increase their perception and creativity in the design process. In parallel with the increase in technological developments, effective use of information technologies in landscape architecture and similar professional disciplines based on visual perception and design skills is an extremely necessary element in the learning process. As confirmed by the chi-square analysis of the class level and the difference in perception on the same design as a result of the survey in the study, the increase in the number and content of design-related courses every year and the expansion of their scope provide positive contributions to design. However, since the student's effective success and grade level in design courses are not known in the study, it may not provide complete accuracy in interpreting the designs. For this reason, H1 hypothesis has been partially confirmed.

In this context, students were shown 5 different plant design studies on a single structural hardscape design. The reasons such as the color of the plants, plant density, forms, positioning in the field, linearity, formal or informal layouts used in these designs directed the students' visual perceptions differently in the designs. Statistical analyzes also confirmed the difference. Five landscape plant design projects prepared for this study were randomly asked to a few of the faculty scholar of the landscape architecture department and it was determined orally that the results were parallel to the results of the final year students' evaluation of design principles. Accordingly, hypothesis H2 is partially confirmed. Düzenli and Alpak (2016) surveyed to determine the effect of the elective course named "Natural Structures and Design" given in the landscape architecture department on the visual perception and creativity of the students. It was tried to determine the differences in the creativity levels of the students who took this course and those who did not choose the course. They found that students who did not take the course had more difficulty in making creative designs. Yıldırım (2019) conducted a survey to determine the design principles and user needs of the parking lots in the SDU (Süleyman Demirel University) campus and examined the current situation of each parking lot on the campus according to the landscape design criteria, and presented the problems and solution proposals related to these areas. In contrast, Taneri and Doğan (2021), in

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their study on architectural students' perceptions of design and the transformation of educational processes, investigated students' perceptions of experiential learning, design and design process, and design education, and whether these perceptions differ according to the class they study. According to their study, students think that design is a concept aimed at eliminating more problems, and these thoughts remain constant for 4 years. Although there are exceptions, they observed that there is no linear progression in the change in perceptions of design between classes in general.

CONCLUSION

In the end it has been determined that the theoretical knowledge that students learn at school limits their designs unless it is supported by experiential, critical and reflective elements. Transforming the educational outcomes of the students into practice in the future, the social and cultural dimensions of the architectural and urban designs they make will come to life on a human scale, and the desire for social benefit in the profession will be encouraging factors in the development of urban culture and urban planning decisions on a large scale. Thus, in the future, the active elements of design in the built environments in cities will be determined, the idea of society will be brought to life again, and the social and cultural welfare in the city and its relationship with architecture will be given more importance. It is aimed that the resulting product will be an example for similar studies to be done in the future. A student, studying in professional disciplines that designs, reproduces, forms and creates 3-dimensional products in order to realize the visual perception in design more accurately should learn the basic rules and principles of design well, and use design components effectively with a holistic approach and must have completed an important part of education by learning to construct the perception correctly. In the case of landscape architecture students, updating their current education on design will enable them to improve their visual perception, enrich their perspective and understand natural environments more deeply. Thus, it will enable them to create more effective and sustainable landscape designs. An effective diversity can be created by modernizing the educational content for the future and ensuring that the relevant courses are taken directly. For example; Nature and landscape painting classes that allow students to visually observe natural environments and express them through drawing, botany courses, where students can understand the characteristics of plants, their growth habits, colors and textures, at a level where they can grasp the psychology of evaluating them as a visual object, and can directly benefit from the selection and use of plants in landscape designs, regular rural or urban field trips, color theory and color application courses, architectural photography, spatial perception and user experience courses, techniques of artistic expression courses can help landscape architecture students develop their visual perception and increase their design skills. This allows them to create more creative,

functional and aesthetically pleasing landscape designs. By cultivating their visual perception abilities, architectural students develop the essential skills and sensibilities required to practice architecture effectively and responsibly in a diverse and dynamic world. In this way, the importance of visual perception for architecture students should be emphasized in every aspect of design practice and actively implemented to provide students with a deep understanding of the perception and experience of spaces. The importance of visual perception should be constantly emphasized to students throughout their education, and students should be provided with practical experiences on how to integrate visual elements. This enables students to gain a deep understanding of the perception and experience of spaces and makes them more effective and sensitive designers. Integrating visual perception as well as other sensory elements into the design process helps spaces create a holistic impact on users and enables architecture students to grow up as versatile and sensitive designers. In this way, architectural education will provide students with the ability to create not only aesthetic but also human-centered and functional spaces.

As a result, each graduate will be able to create modern approaches to the formation of more livable and healthy designs, especially by actively participating in the city-related decision-making mechanisms of local governments. That's why visual perception is integral to every stage of the landscape design process from conceptualization and planning to implementation and maintenance. By understanding how people perceive and interact with their environment visually, landscape designers can create spaces that are not only beautiful but also functional, sustainable, and meaningful.

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