EXAMINATION OF SPATIAL PERCEPTION CHANGE IN ARCHITECTURE EDUCATION THROUGH EDUCATIONAL BUILDINGS

N. Tuba YUSUFOĞLU [iD][1*], Gökhan UŞMA [iD][2]

[1:] Adana Alparslan Türkeş Bilim ve Teknoloji Üniversitesi, Mimarlık ve Tasarım Fakültesi, Mimarlık Bölümü, Mimarlık Tarihi Anabilim Dalı.

[2:] Adana Alparslan Türkeş Bilim ve Teknoloji Üniversitesi, Mimarlık ve Tasarım Fakültesi, Mimarlık Bölümü, Bina Bilgisi Anabilim Dalı.

Abstract

Many definitions have been made on the concept of space that is encountered as architectural product. This concept has been discussed for many years and various ideas have been developed thereupon. In this regard, this study aims to investigate and brings up for discussion how spatial perception knowledge of architecture students and their interpretation skills of this knowledge have been changed in accordance with their education. In this study, the concept of space, architectural design education and perception are firstly examined. Following the literature review, in the context of topic, award-winning four educational buildings among the contemporary architecture works, which were constructed in and after 2008 are selected. Along with four questions and fourteen attributes identified in company with the findings obtained by the literature review, the students are ensured to evaluate four buildings selected within the scope of the study. The questionnaire participants consist of the students from first, second, third and fourth years in the department of architecture. In the study, when 1st and 2nd year-students are compared with the 3rd and 4th year-students, it is concluded that the 3rd and 4th years pay more attention to parameters, that they have more advanced material, design fundamental approaches and higher awareness level.

Keywords: Spatial perception, Architecture education, Architectural design, Educational buildings, Contemporary architecture.

MİMARLIK EĞİTİMİNDE MEKANSAL ALGI DEĞİŞİMİNİN EĞİTİM YAPILARI ÜZERİNDEN İNCELENMESİ

Özet

Mimari ürün olarak karşımıza çıkan mekan kavramı üzerine birçok tanım yapılmıştır. Bu kavram uzun yıllardır tartışılmış ve bunun üzerine çeşitli fikirler geliştirilmiştir. Bu bağlamda bu çalışma, mimarlık öğrencilerinin mekansal algı bilgilerinin ve bu bilgiyi yorumlama becerilerinin eğitimlerine uygun olarak nasıl değiştiğini araştırmayı ve tartışmaya açmayı amaçlamaktadır. Bu çalışmada öncelikle mekan kavramı, mimari tasarım eğitimi ve algı incelenmiştir. Literatür taramasının ardından konu bağlamında, 2008 yılı içinde ve sonrasında inşa edilen çağdaş mimari eserler arasında ödüllü dört eğitim binası seçilmiştir. Literatür taraması ile elde edilen bulgular eşliğinde belirlenen dört soru ve on

---

[*] Sorumlu Yazar: ntyusufoglu@atu.edu.tr

dört özelliğin yanı sıra, öğrencilerin çalışma kapsamında seçilen dört binayı değerlendirmeleri sağlanmaktadır. Anket katılımcıları Mimarlık Bölümü'nde birinci, ikinci, üçüncü ve dördüncü sınıf öğrencilerinden oluşmaktadır. Çalışmada, 1. ve 2. sınıf öğrencileri 3. ve 4. sınıf öğrencileri ile karşılaştırıldığında, 3. ve 4. sınıfların parametrelere daha çok dikkat ettikleri, malzeme, tasarım temel yaklaşımları ve farkındalık düzeylerinin daha yüksek olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Mekan Algısı, Mimarlık eğitimi, Mimari tasarım, Eğitim yapıları, Çağdaş mimarlık

1. INTRODUCTION

The concept of space is considered as an environment which meets the conditions suitable for the analysis of human-environment interaction; while architectural space, according to Norberg-Schulz (1971), is a piece of space which meets the physiological, psychological and social requirements of users (Norberg-Schulz, 1971). According to Turkish Language Society's (TDK) dictionary definition, the term perception is defined as "comprehending something by directing attention to that thing, comprehension" (TDK Turkish Dictionary URL-1). Rapoport defines perception as "direct sensation of the environment in a given time period" (Rapoport, 1980).

The subject matter of whether the ability of perceiving is innate or acquired skills constitute the basis of perceiving has been discussed by the philosophers such as Descartes, Kant, Berkeley and Locke. Rapoport argues that knowing is comprised of direct and indirect experiences, while mere perception is comprised at once (Cüceloğlu, 1991) (Şahin, 2019). Maslow (1970) asserts that all humans have innate potential creativity and they lose it over time due to education; while Montessori regards curiosity and creative imagination among the values of a child lost during education (Montessori, 1992). On the other hand, experience and learning allow the acquired ability of perceiving to be used at a higher level. According to Lang (1987), the perceptual theories are classified into two main groups: "perceptual theories based on sensation" and "perceptual theories based on knowledge" (Lang, 1987). There are two fundamental notions in perceiving the space as sensory perception and cognitive perception. Sensory perception is the acts of seeing, hearing, smelling and touching. According to Downs and Stea (1973), cognitive perception is considered as a phenomenon analyzed on a series of psychological transformations (encodings, storages, recalls, relative places, etc.) of the information acquired by the individual (Downs, 1973).

The approach of art ontology towards perception is also interesting. Perception is regarded as an act of knowledge. It is considered as the activity of gaining required information for understanding the objects and showing a particular reality. On the other hand, the fact that perception becomes a mere act as "perception" is formed by the long-term experience and education of humanity. According to this approach, act of perception improves depending on the development of human. Meanwhile, the image plays a role as a conceptual representation of external world within the integrated structure of perception with its own internal dynamics and information processes (Kahvecioğlu, H., 1998).

2. METHODOLOGY

For the purpose of examining the spatial perception change in architecture education, in this study, a questionnaire study is carried out by asking questions to the architecture students through various visual images of contemporary buildings. In the study, the architecture students are asked to evaluate visual images of buildings selected through the parameters and various attributes identified as a result of literature review.

In the first part of the study, the students are asked to read/evaluate the information on the function and material of the building, basic approach directing design and interior of the building (in company with the plan). The assessment of these four parameters given in Table 1 is carried out as two separate groups as the 1st and 2nd year-students are in the same group, while the 3rd and 4th year-students are in the other group (Table 1).

Table 1. Identified Parameters

Parameters to be questioned at the first stage
Function
Material
Basic approach directing design
Perception regarding interior (information on plan reading)

In the second part of the study, five factor groups (with semantical differences) and the attributes that belong to these factor groups are identified based on the attributes of Sanoff (2016) in the environment assessment technique. Sanoff's 26 attributes are shown in Table 2, the eliminated attributes (similar and emotional attributes) are identified in red and strike-through (Table 2). Among these attributes, 14 attributes, which are evaluated within the scope of this study, are identified in Figure 1 (Figure 1). The students are asked to evaluate 4 buildings addressed within the scope of the study through these 14 attributes.

Table 2. Sanoff (2016), visual research methods in design

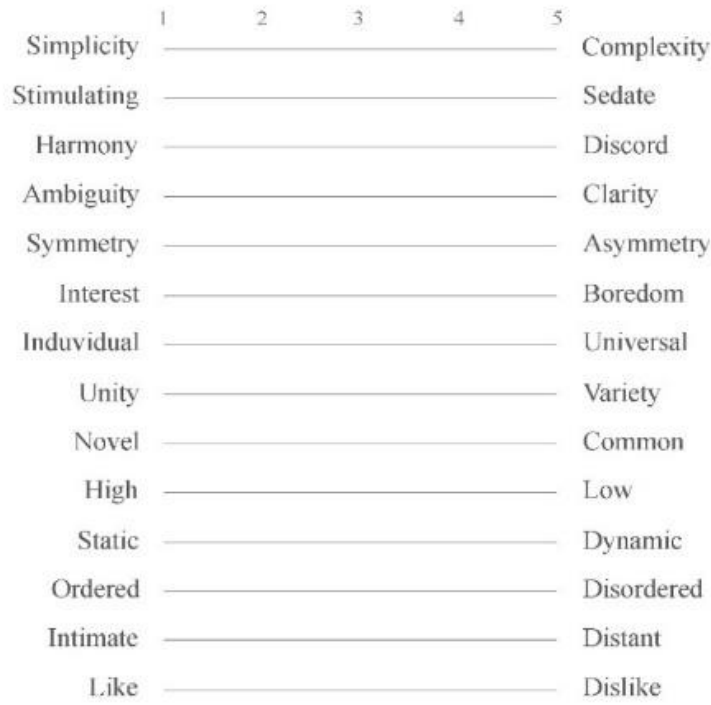| Sanoff's (2016) attributes in environment assessment technique			
Simplicity–complexity	~~formal informal~~	individual–universal	~~paradoxicality–comprehensibility~~
stimulating sedate	- symmetry–asymmetry	unity–variety	~~exhilarated depressed~~
harmony discord	– ~~boldness unobtrusiveness~~	~~austere sensuous~~	high – low
~~roughless smoothness~~	interest–boredom	novel common	– ~~peaceful disruptive~~
ambiguity-clarity	~~hardness softness~~	~~satisfaction frustration~~	static-dynamic
~~uniform divergent~~	~~tense relaxed~~	~~calm violent~~	ordered–disordered
like–dislike	intimate–distant		

	1	2	3	4	5	
Simplicity						Complexity
Stimulating						Sedate
Harmony						Discord
Ambiguity						Clarity
Symmetry						Asymmetry
Interest						Boredom
Induvidual						Universal
Unity						Variety
Novel						Common
High						Low
Static						Dynamic
Ordered						Disordered
Intimate						Distant
Like						Dislike

Figure 1. Final attributes identified to be used within the scope of the study after the elimination

3. CASE STUDY

The questionnaire study covers the architecture students from the 1st, 2nd, 3rd and 4th year. The distribution of classes by the sample size is given in Table 3 (Table 3). While the questionnaire is being prepared, it is decided that the buildings that students are asked to interpret should be award-winning architectural products and should be contemporary architectural, educational buildings implemented after 2008.

Table 3. Participation to the questionnaire by educational status

First Year Students	Second Year Students	Third Year Students	Fourth Year Students	Total
21%(15 people)	29%(20 people)	20%(14 people)	30%(21 people)	70 people

3.1. Selected Buildings

The purpose which is mentioned above, 4 buildings are selected.

3.1.1. Building 1: Broomlands Primary School

It is situated in Kelso, Scotland. The architectural office of the building, which was completed in 2018, is Stallan-Brand. The awards for the building are as follows: Broomlands Primary School Award from the Royal Society of Architects in Scotland (RIAS) 2019, Education Award at Glasgow Institute of Architects 2018 Awards and Supreme Award

Winner; it also received the Best New Building Commercial Project awards at the Borders Building Design Awards 2018 for Broomlands Primary School (Figure 2).

Figure 2. Building 1- Broomlands Primary School, view and plans, Kelso, Scotland (URL-2)

3.1.2. Building 2: Royal Technology Institute Architecture School

Place of construction; Stockholm, Sweeden. It was designed in 2015. The design office of the building is Tham & Videgard Arkitekt and its architects are Martin Videgard and Bolle Tham. The building received the 2016 ArchDaily Education Building of the Year award (Figure 3).

Figure 3. Building 2- Royal Technology Institute Architecture School, Stockholm, Sweden (URL-3)

3.1.3. Building 3: TACCE Wood School Bali

The building is in Indonesia and was opened in 2013. Its design office is Arul Selven Charity Foundation of TACCE (Tjok Agung Conservation and Cultural Education) (Alternative Education, School, Education Program). It received an award in 2019 (Figure 4).
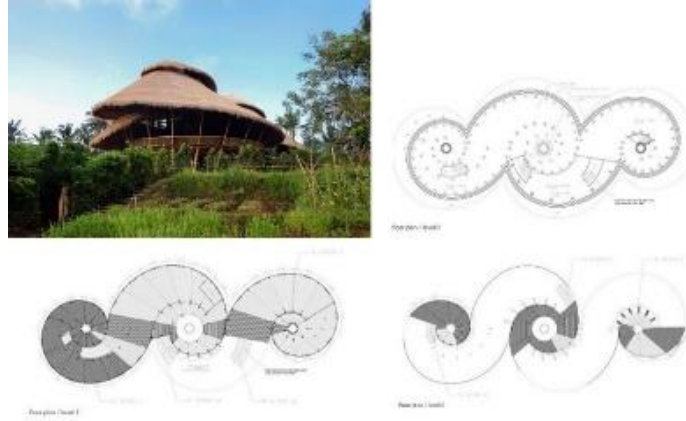
Figure 4. Building 3- TACCE Wood School Bali, Indonesia (URL-4)

3.1.4. Building 4: PAVE Academy Charter School

The building is situated in Brooklyn, NY, USA and was opened in 2008. The architecture office is Mitchell Giurgola. The awards of the building are as follows: National AIA Committee for Architecture on Education Design Award (2014), Building Brooklyn Design Award (2014) and Best K-12 Education Project by Engineering News Record (2014) (Figure 5).
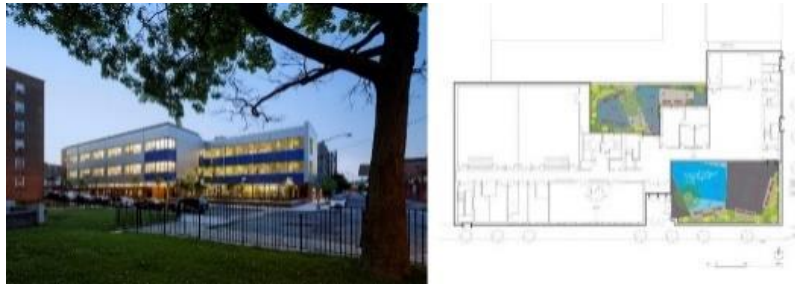

Figure 5. Building 4- PAVE Academy Charter School, Mitchell Giurgola Architecture (URL-5)

3.2. Findings

According to the selected 4 buildings, the findings are evaluated separately as Building 1, Building 2, Building 3 and Building 4.

3.2.1. Building 1: Broomlands Primary School

For "Building 1", function of the building is answered as cultural building by 71%, commercial building by 17%, educational building by 6%, sheltering building by 3% and industrial building by 3% of the students from the 1st and 2nd years; while it is answered as cultural building by 86%, commercial building by 9% and educational building by 6% of the students from the 3rd and 4th years (Table 4).

Table 4. Findings obtained according to the function of Building 1

	Commercial building	Religious building	Sheltering building	Educational building	Cultural building	Industrial building
1st&2nd years	17%		3%	6%	71%	3%
3rd&4th years	9%			6%	86%	

For "Building 1"; in the findings obtained according to the dominant materials used in the building (by specifying maximum two materials); it is answered as wooden by 37%, glass by 30%, concrete by 7%, steel by 7%, stone by 3%, metal by 3%, bamboo by 3% and brick by 1% of the students from the 1st and 2nd years; while it is answered as glass by 38%, wooden by 27%, steel by 23%, concrete by 8%, stone by 1%, metal by 1% and bamboo by 1% of the students from the 3rd and 4th years (Table 5).

Table 5. For Building 1, findings obtained according to the dominant materials used in the building (by selecting maximum two materials).

	Wooden	Concrete	Glass	Stone	Metal	Brick	Steel	Bamboo
1st &2nd years	37%	7%	30%	3%	3%	1%	7%	3%
3rd &4th years	27%	8%	38%	1%	1%		23%	1%

For "Building 1"; in the findings obtained according to the basic approach directing design; it is answered as mobility/dynamism by 74%, modularity by 11%, innovativeness by 6%, contrast by 6% and complexity by 3% of the students from the 1st and 2nd years; while it is answered as mobility/dynamism by 60%, contrast by 11%, complexity by 11%, flexibility by %9, innovativeness by 6% and modularity by 3% of the students from the 3rd and 4th years (Table 6).

Table 6. For Building 1, the findings obtained according to basic approach directing design.

	Flexibility	Mobility/ Dynamism	Innovativeness	Contrast	Complexity	Modularity	Sustainability	Localness	Simplicity
1st& 2nd years		74%	6%	6%	3%	11%			
3rd&4th years	9%	60%	6%	11%	11%	3%			

For "Building 1"; the findings obtained with regard to the interior are as follows: it is answered as inviting by 34%, mysterious interior by 26%, exciting by 23% and legible interior by 17% of the students from the 1st and 2nd years; while it is marked as inviting by 54%, legible interior by 14%, unlikable by %11 and mysterious interior by 6% of the students from the 3rd and 4th grades (Table 7).

Table 7. For Building 1, the findings obtained regarding internal space considering the Building.

	Legible interior	Mysterious interior	Inviting	Unlikable	Exciting
1st & 2nd years	17%	26%	34%		23%
3rd & 4th years	14%	6%	54%	14%	11%

3.2.2. Building 2: Royal Technology Institute Architecture School

For "Building 2"; the findings obtained with regard to function of the building are as follows: the question is answered as cultural building by 43%, commercial building by 26%, educational building by 20%, sheltering building by 20% and industrial building by 6% of the students from the 1st and 2nd years; while it is answered as cultural building by 69%, commercial building by 17%, educational building by 14% of the students from the 3rd and 4th years (Table 8).

Table 8. For Building 2, the findings obtained with regard to function of the building.

	Commercial building	Religious building	Sheltering building	Educational building	Cultural building	Industrial building
1st & 2nd years	26%		6%	20%	43%	6%
3rd & 4th years	17%			14%	69%	

For "Building 2"; the findings obtained according to the dominant materials (maximum two options) used in the building are as follows: the question is answered as concrete by 28%, glass by 21%, metal by 3%, stone by 2% and wooden by 1% of the students from the 1st and 2nd years; while it is answered as concrete by 25%, glass by 23%, steel by 8%, metal by 6% of the students from the 3rd and 4th years (Table 9).

Table 9. For Building 2, the findings obtained according to dominant materials (maximum two options) used in the building.

	Wooden	Concrete	Glass	Stone	Metal	Brick	Steel	Bamboo
1st&2nd years	1%	28%	21%	2%	3%		2%	
3rd&4th years		25%	23%	1%	6%		8%	

For "Building 2"; the findings obtained according to basic approach directing design are as follows: the question is answered as flexibility by 29%, modularity by 14%, mobility/dynamism by 11%, complexity by 11%, innovativeness by 9%, contrast by 9%, localness by 9%, simplicity by 6% of the students from the 1st and 2nd years; while the same is answered as flexibility by 27%, mobility/dynamism by 23%, complexity by 19%, contrast by 12%, innovativeness by 4%, modularity by 4%, sustainability by 4%, localness by 4% and simplicity by 4% of the students from the 3rd and 4th years (Table 10).

Table 10. For Building 2, the findings obtained according to basic approach directing design.

	Flexibility	Mobility/ Dynamism	Innovativeness	Contrast	Complexity	Modularity	Sustainability	Localness	Simplicity
1st&2nd years	29%	11%	9%	9%	11%	14%	3%	%9	%6
3rd&4th years	27%	23%	4%	12%	19%	4%	4%	4%	4%

For "Building 2"; the findings obtained according to the interior are as follows: the question is answered as mysterious interior by 35%, legible interior by 29%, inviting by 16%, exciting by 13% and unlikable by 6% of the students from the 1st and 2nd years; while it is answered as mysterious interior by 42%, inviting by 23%, legible by 19%, unlikable by 8% and exciting by 8% of the students from the 3rd and 4th years (Table 11). As given in the previous building, it is understood that also for Building 2, it is understood that the concept of "mysterious interior" is created in mind regarding the interior of the building.

Table 11. For Building 2, the findings obtained with regard to the interior.

	Legible interior	Mysterious interior	Inviting	Unlikable	Exciting
1st&2nd years	29%	35%	16%	6%	13%
3rd&4th years	19%	42%	23%	8%	8%

3.2.3 Building 3: TACCE Wood School Bali

For "Building 3", the findings obtained according to function of the building are as follows: Building 3 is answered as sheltering building by 61%, commercial building by 18%, cultural building by 12%, religious building by 6%, educational building by 3% of the students from the 1st and 2nd years; while it is answered as sheltering building by 39%, cultural building by 21%, religious building by 18%, educational building by 14%, commercial building by 4%, industrial building by 4% of the students from the 3rd and 4th years (Table 12).

Table 12. For Building 3, the findings obtained according to function of the building.

	Commercial building	Religious building	Sheltering building	Educational building	Cultural building	Industrial building
1st & 2nd years	18%	6%	61%	3%	12%	
3rd & 4th years	4%	18%	39%	14%	21%	4%

For "Building 3", the findings obtained according to basic approach directing design are as follows: Building 3 is answered as mobility/dynamism by 44%, flexibility by 15%, innovativeness 3%, modularity by 3%, sustainability 3% and simplicity by 3% of the students from the 1st and 2nd years; while it is answered as mobility/dynamism by 24%, flexibility 21%, sustainability by 21%, localness by 21%, innovativeness by 7%, complexity by 3% and modularity by 3% of the students from the 3rd and 4th years (Table 14).

Table 13. For Building 3, the findings obtained according to basic approach directing design.

	Flexibility	Mobility/ Dynamism	Innovativeness	Contrast	Complexity	Modularity	Sustainability	Localness	Simplicity
1st & 2nd yeas	15%	44%	3%			3%	3%	29%	3%
3rd & 4th years	21%	24%	7%		3%	3%	21%	21%	

For "Building 3", the findings obtained with regard to interior are as follows: Building 3 is answered as mysterious interior by 51%, exciting by 17%, legible interior by 14%, inviting by 11% and unlikable by 6% of the students from the 1st and 2nd years; while it is answered as mysterious interior by 54%, legible interior by 23%, inviting by 15%, unlikable by 4% and exciting by 4% of the students from the 3rd and 4th years (Table 15).

Table 14. For Building 15, the findings obtained with regard to interior.

	Legible interior	Mysterious interior	Inviting	Unlikable	Exciting
1st & 2nd years	14%	51%	11%	6%	17%
3rd & 4th years	23%	54%	15%	4%	4%

3.2.4. Building 4: PAVE Academy Charter School

For "Building 4", the findings obtained with regard to function of the structure are as follows: Building 4 is answered as commercial building by 51%, educational building by 29%, industrial building by 11%, sheltering building by 6%, cultural building by 3% of the students from the 1st and 2nd years; while it is answered as educational building by 43%, commercial building by 34%, industrial building by 20%, sheltering building by 3% of the students from the 3rd and 4th years (Table 16).

Table 15. For Building 4, the findings obtained with regard to function of the building.

	Commercial building	Religious building	Sheltering building	Educational building	Cultural building	Industrial building
1st&2nd years	51%		6%	29%	3%	11%
3rd&4th years	34%		3%	43%		20%

For "Building 4", the findings obtained according to the dominant materials (by selecting maximum two options) are as follows: It is answered as concrete by 47%, glass by 36%, metal by 5%, stone by 3%, brick by 3%, steel by 3%, wooden by 2% of the students from the 1st and 2nd years; while it is answered as concrete by 40%, glass by 37%, steel by 13%, metal by 10% and stone by 2% of the students from the 3rd and 4th years (Table 17).

Table 16. For Building 4, the findings obtained according to the dominant materials (by selecting maximum two options) used in the building.

	Wooden	Concrete	Glass	Stone	Metal	Brick	Steel	Bamboo
1st&2nd years	2%	47%	36%	3%	5%	3%	3%	
3rd&4th years		40%	37%	2%	10%		13%	

For "Building 4", the findings obtained according to basic approach directing design are as follows: Building 4 is answered as simplicity by 62%, modularity by 2%, innovativeness by 12%, sustainability by 6%, localness by 6%, flexibility by 3% of the students from the 1st and 2nd years; while it is answered as simplicity by 40%, modularity by 31%, sustainability by 14%, innovativeness by 6%, mobility/dynamism by 3% of the students from the 3rd and 4th years (Table 18).

Table 17. For Building 4, the findings obtained according to basic approach directing design.

	Flexibility	Mobility/ Dynamism	Innovativeness	Contrast	Complexity	Modularity	Sustainability	Localness	Simplicity
1st&2nd years	3%		12%			12%	6%	6%	62%
3rd&4th years			3%	6%	6%	31%	14%		40%

For "Building 4", the findings obtained with regard to interior are as follows: It is answered as legible interior by 71%, unlikable by 11%, mysterious interior by 9%, inviting by 9% of the students from the 1st and 2nd years; while it is answered as legible interior by 80%, unlikable by 9%, mysterious interior by 6% and inviting by 6% of the students from the 3rd and 4th years (Table 19).

Table 18. For Building 4, the findings obtained with regard to interior.

	Legible interior	Mysterious interior	Inviting	Unlikable	Exciting
1st&2nd years	71%	9%	9%	11%	
3rd&4th years	80%	6%	6%	9%	

14 attributes examined in the second part of the study are simplicity, stimulating, harmony, ambiguity, symmetrical, interest, individual, unity, novel, high, static, ordered, intimate and like (Sanoff, 2016). In the study, it is asked to answer the question by relativeness in the scale from 1 to 5. The result is summarized in the table below for all 4 buildings (Fig. 6).
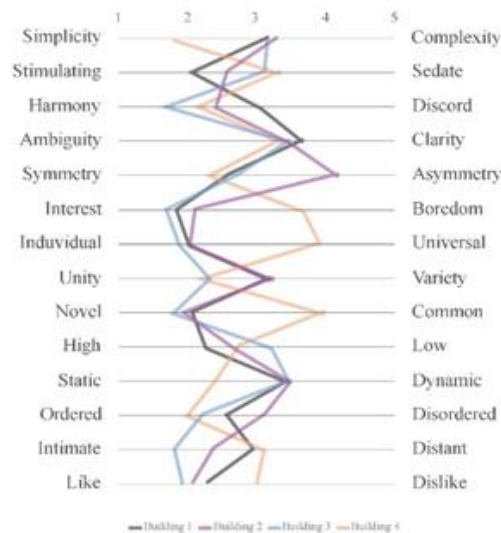
Figure 6. Comparative analysis of 14 attributes in 4 buildings according to the scale of semantic differences

When we evaluate or compare these 4 buildings by considering the semantic differentiation scales; it is concluded as more clear, interesting and individual for the 1st Building; asymmetrical, interesting and novel for the 2nd Building; more harmonic, interesting, individual, novel, sincere and likable for the 3rd Building. The most different results are observed in the 4th Building; the building is found to be more boring, common and ordinary.

4. EVALUATION

When we evaluate the 4 buildings selected in general;

Among the findings obtained according to function of Building 1; it is concluded that Building 1 is understood as a cultural building rather than an education building. Building 1 is perceived as a cultural building by 71% of the students from the 1st and 2nd years; by 86% of the students from the 3rd and 4th years. The answer for an educational building is given equally (6%) by both groups (the 1st-2nd years and the 3rd-4th years), while the building is regarded as a commercial building by 17% of the students from the 1st and 2nd years. As the reason for this situation, it is considered that the interesting appearance of Building 1 as well as its roof form (triangles) can be a determinant for being perceived as a cultural building rather than an educational building. Both groups selected wooden and glass as dominant materials for Building 1. On the other side, 23% of the students from the 3rd and 4th years specify steel as dominant material in the building. This can be interpreted as more detailed thinking, knowledge on material and increase of perception towards to the senior years. In the evaluation of basic approach directing design of Building 1, both groups substantially provide the same answer (mobility/dynamism). For Building 1, the 1st and 2nd year-students evaluate as modularity by 11%, innovativeness and contrast by 6%, complexity by 3%, while the 3rd and 4th year-students provide the answer of modularity by 11%, innovativeness and contrast by 6% and complexity by 3%. This suggests that the 3rd and 4th year-students perceive/evaluate the building in company with more parameters. There is a differentiation from the 1st and 2nd year-students particularly with the answers of contrast, complexity and flexibility. It is concluded that the roof form creates contrast and complexity with the rectangular form of the building and that the high roof form provides flexibility in the interior.

When we consider Building 2 with regard to its function, the primary answer of both groups is cultural building. 43% of the 1st and 2nd year-students and 69% of the 3rd and 4th year-students perceive Building 2 as a cultural building. Again, there are differences in the other options as well for both groups. For example, while the building is evaluated as a commercial building by 26%, an educational building by 20%, sheltering building by 6% and industrial building by 6% of the students from the 1st and 2nd years; it is perceived as a commercial building by 17% and educational building by 14% of the students from the 3rd and 4th years. The failure of perceiving the building as an educational building accurately can be curvilinear/different form, innovative materials and solutions in the plan. It is thought that the novel design of the building can be the reason of perceiving it as a cultural building. In the evaluation according to dominant material used in visual image readings for Building 2; both groups specify material of concrete by the similar rate. The next and the closest answer after concrete is glass. Dissimilarly, the 3rd and 4th year-students specify steel by 85% and metal by 6%. It can be concluded that the knowledge on material of the senior classes is more advanced. For Structure 2, it is seen that both groups evaluate flexibility by similar rate (by 29% for the 1st and 2nd year- and by 27% for the 3rd and 4th year-students) according

to the basic approach directing design. However, there are differences in senior years. For example, while the 1st and 2nd year-students point out the concept of modularity after flexibility, the 3rd and 4th year-students point out mobility/dynamism and complexity.

When Building 3 is considered with regard to its function, it is seen that the building is perceived as a sheltering building rather than an educational building. Especially the 1st and 2nd year-students provide this answer at a higher rate. As the reason of that the function of sheltering building is dominant among the answers, it is thought that using local material and constructing the building in a rural area can be effective. When Building 3 is evaluated according to dominant material, it is seen that both groups answer as the material of wooden and bamboo as the primary answer. The 3rd and 4th year-students are more successful in identifying the correct answer, as their first selection is the material of bamboo. According to the basic approach directing design, both groups answer primarily movement/dynamism and secondarily localness. Still, there are several differences in the answers. For example, the answer of sustainability (21%) is at higher rate than the 1st and 2nd year-students. This can be evaluated as a sign of awareness of the problems of the 21th century in accordance with the correct materials and design principles towards the senior years. The fact that the students from the 3rd and 4th year-students took courses on sustainability in these educational levels and that their awareness has increased can be shown as another reason.

When Building 4 is considered with regard to its function, there are differences in both groups. For example, 51% of the 1st and 2nd year-students give the answer of commercial building as function of the building, while 43% of the 3rd and 4th year-students give the answer of educational structures. It means that, the 3rd and 4th year-students answer more accurately for the function of the building. When we evaluate according to dominant material, all groups specify concrete and after that, glass as the dominant material. On the other side, the 3rd and 4th year-students evaluate the material as steel (13%) and metal (10%) unlike the other groups. In this case, it can be interpreted as the senior years (the 3rd and 4th year-students) have wider knowledge on material. In the approach directing design, the answer of simplicity stands out in both groups. On the other hand, the 3rd and 4th year-students predominantly give the answer of modularity (34%) and after that, sustainability (14%). In the 1st and 2nd year-students, these rates are lower almost in half. This can be interpreted as the level of education increases, awareness and seeking (such as modularity and sustainability) increase accordingly.

When Building 1, Building 2 and Building 3 are considered; the results are considerably different from the findings obtained with regard to the interior, and there is no significant difference among the education levels. Its reason is regarded as the fact that this question requires a subjective approach. The findings are slightly different for Building 4. The question of Building 4 on the perception of the interior is that both groups predominantly give the answer of "legible interior" (71% and. 80%). Both groups regard the building less mysterious and inviting at the similar rates. There are also students who evaluate the building as unlikable (the 1st and 2nd year-students by 11% and the 3rd and 4th year-students by 9%). In the results, there is no individual/student who evaluates the building as "exciting". Indeed, this building is more of a modern architecture (an architectural work of the 20th century), and is among the building types with a lot of works in many parts of the world. It is thought that this result emerges, since the building has a simpler and currently, a familiar plan and visual image.

5. CONCLUTION

In this study, which endeavors to examine the spatial perception change in architecture education through the educational buildings selected among the contemporary architectural works constructed in the 21st century, the rate of knowing the function of selected, award-winning buildings is low according to the analysis examining the findings concerning the concept that is created in mind when considering the function, dominant material, basic approach directing design and interior for 4 buildings. Its reason brings the question whether the educational buildings have a more ordinary and classical schematic language in mind. Whereas, there are different forms, materials and approaches in the selected works. Building 4 is the most apparent building which has a simpler and currently a familiar plan and visual image among the works. Therefore, especially the senior years (the 3rd and 4th year-students) explicitly state that Building 4 is an educational building. Both groups highly provide correct answer for the dominant materials. In this context; it should be noted that there is little difference between the years; however, it also reveals that the 3rd and 4th year-students have wider knowledge on material (such as steel, metal). As the basic approach directing design, substantial concepts such as mobility/dynamism, flexibility, localness and simplicity are given as answers. In this context, significant results emerge for each selected building. However, again, senior years (the 3rd and 4th years) take more paradigms into consideration. It can be concluded as the courses in the curriculum of the 3rd and 4th year-students have increased their awareness. The predominant results for interior are inviting, mysterious and legible interior. Regarding the attributes, all of 4 buildings are analyzed comparatively in accordance with 14 attributes which finds out similar and different cases.

In this context, consequently; when the 1st and 2nd year-students and the 3rd and 4th year-students are compared, it is concluded that the senior years (the 3rd and 4th year-students) pay more attention to parameters, have more advanced material, design fundamental approach and higher awareness level. This study, which is limited to the 4 buildings selected within the scope of this topic, is expected to make guiding contributions into the future studies.

REFERENCES

Downs, R.S. (1973). "Image and Environment: Cognitive Mapping and Spatial Behavior", Chicago: Aldine

Kahvecioğlu, H. (1998). "Mimarlıkta İmaj: Mekansal İmajın Oluşumu ve Yapısı Üzerine Bir Model", PhD Thesis, İTÜ, İstanbul

Lang, J. (1987). "Creating Architectural Theory- The Role of the Behavioral Sciences in Environmental Design", Van Nostrand Reinhold, New York

Montessori, M. (1992). "Çocuk Eğitimi: Montessori Metodu", Özgür Yayın Dağıtım, İstanbul

Norberg-Schulz, C. (1971). "Existance, Space and Architecture", Studio Vista, London, p.14-16

Rapoport, A. (1980). "Cross-Cultural Aspects of Environmental Design", Environment and Culture (Ed. I Altman), Plenum, New York

Rapoport,   A. (1990). "The Meaning of the Built Environment", The University of Arizona Press, Tucson

Sanoff,   H. (1974). "Measuring Attributes of the Visual Encironment", ed. Jon Lang, Designing For Human Behavior: Architecture and the Behavioral Sciences, Dowden Hutchinson Ross Inc, Pennyslvania

Sanoff,   H. (2016). "Visual Research Methods in Design", Routledge Revivals, First Published, New York, p.30

Şahin,   B.H., Şahin, A. (2019). "Mimarlık Eğitimi Sürecinde Bireyin Mekan Algısının Değişimi Üzerine Bir Deneme", Online Journal of Art and Design, Vol:7, Issue:3, July 2019,   http://www.adjournal.net/articles/73/737.pdf   (Accessed: 16.05.2022)

URL 1 Türk Dil Kurumu (TDK) Türkçe Sözlük   https://www.tdk.gov.tr/   (Accessed: 22.06.2022)

URL   2   Building:1,   Broomlands   Primary   School,   Link: https://stallanbrand.com/projects/broomlands-primary-school/   ,   (Accessed: 24.06.2022)

URL   3   Building:2, Royal   Teknoloji   Enstitüsü   Mimarlık   Okulu,   Link: https://www.gzt.com/arkitekt/isvec-kraliyet-teknoloji-enstitusu-mimarlik-okulu-3596671 , (Accessed: 24.06.2022)

URL 4 Building:3, TACCE Wood School Bali, Link: https://greenteacher.com/green-school-in-bali/), (https://theindexproject.org/award/nominees/3282 , (Accessed: 24.06.2022)

URL   5   Building:4,   PAVE   Academy   Charter   School,   Link: https://www.scapestudio.com/projects/pave-academy-playscape/ https://www.architectmagazine.com/project-gallery/pave-academy-charter-school (Accessed: 25.06.2022)