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Investigation of the differences in designers' spatial perception in interior spaces using Kokedama

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Abstract: The word kokedama consists of the Japanese words "koke" (moss) and "dama" (ball). Due to its easily accessible materials and easy construction, it has become an application that almost everyone can do, and its use is expected to become widespread. The aim of this study is to investigate the differences in the spatial perceptions of designers who have received basic design education in different faculties in the case of interiors that including kokedama. To measure the differences in spatial perception, photographs of 8 different public interiors were processed and a survey was administered to the subjects. The survey results were analyzed statistically. According to the results of the study, the increase in the value of the perceptibility and simplicity criteria also increases the value of other criteria. As the value of perceptibility and simplicity increases in kokedama applications, the perception of complexity decreases. This data explains that the use of kokedama contributes positively to spatial perception. The criteria that have the most effect when they are together are the structure/identity and perceptibility criteria. The highest scorers on the criteria affecting spatial perception were graduates of the faculty of fine arts, while the lowest scorers were graduates of the faculty of agriculture.

Keywords: *Design, Interior, Kokedama, Spatial perception.*

1. Introduction

Plants that are taken from their natural environments and placed in pots/containers or plant environments and that can continue their lives in indoor spaces similar to their growing and development environments are known as indoor plants. While these plants appeal to our senses with their features such as size, form, color, texture, smell and seasonal change, they also functionally become indispensable design elements in designing dynamic and more livable interior spaces [1].

People living in big cities spend at least 80-90% of their lives in indoor environments [2]. Urbanites living in a dense and congested urban fabric long for nature and greenery. These people, who spend most of their time indoors, have started to use indoor plants in building blocks for their green needs [3, 4, 5].

Plants are the elements that create the unique identity of the interior. The aim of interior design with plants is to organize livable spaces for plants and functional and aesthetic spaces for people, provided that they use various features of plants by treating plants as architectural elements [6, 7]. In this respect, the presence of plants that provide our connection with natural environments indoors and have the feature of improving the quality of space becomes important [8]. With a planting design activity carried out in the interior, it is possible to create attractive spaces by taking advantage of the design features of plants such as texture, color, line, size and form [9]. This contribution of plants emerges thanks to their characteristics such as leaves and flowers [10, 11].

Research conducted in recent years reveals the importance of indoor plants for human health. It has been determined that it has effects on personal health, creativity, autonomous stimulation, stress management, self-renewal and perfForestryce enhancing effects, especially in the work environment [12, 13]. Researchers also mentioned that office environments with plants are generally perceived as more attractive [14, 15, 16].

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The word kokedama consists of the Japanese words "koke" (moss) and "dama" (ball). Kokedama is made by rolling the root of a plant into a ball with garden soil, covering the ball with pieces of moss, and then tying the moss together with thread to secure it in place on the surface of the ball. In short, kokedama is a bonsai tree that is planted in a moss ball instead of a pot and provides a new kind of beauty, different from traditional ornamental plant species [17]. Kokedamas are one of the popular planting applications we have come across indoors lately. Due to its easily accessible materials and easy construction, it has become an application that almost everyone can do. Typical kokedama examples are seen in Figure 1.

Figure 1.
Typical kokedama examples [18].

People perceive space with various senses [19]. Physiological, psychological characteristics, personality structure and cognitive characteristics of the person perceiving (the person's past experiences and socio-cultural approach) play an important role in the formation of the perception of space. As a result of all these, the person's perception of the object or place is formed [20]. According to Lynch [21], the relationship between image and physical form creates our spatial perception. The concept of spatial perception is a process that starts with sensation (first image or image) and extends to perception (general image) and meaning (real image) [22].

Studies have revealed that the concepts that are effective in explaining the perception of space are complexity, readability, consistency-suitability, mystery-attraction, simplicity, perceptibility, structure-identity [23, 24, 25, 26, 27, 28, 29, 30].

In Turkey, basic design education is taught in different faculties under different departments. The aim of this study is to investigate the differences in the spatial perceptions of designers who have received basic design education in different faculties in the case of interiors that including kokedama. Studies measuring spatial perception are abundant in the literature. In studies measuring spatial perception in interior spaces, concepts such as size, shape, texture, color and brightness have generally

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been used as criteria regarding space. There are very few studies using plant materials when measuring spatial perception. The unique aspect of this study is that it examines the use of kokedama, which is a new concept in measuring spatial perception and on which very few studies have been conducted yet. Thus, this study also provides resources to the literature on the use of kokedama to increase spatial perception in interior spaces.

The study attempts to confirm two hypotheses.

Hypothesis$_1$: There are differences in the perception of spaces designed with kokedama among designers who completed their design education in different faculties.

Hypothesis$_2$: The use of kokedama indoors contributes positively to spatial perception.

2. Material and Method

The basic materials of the study are photographs used to measure differences in spatial perception, subjects who received basic design training in different faculties, and a spatial perception survey applied to the subjects.

According to Cakci [31], many studies have been carried out on the usability of photographs and slides in environmental preference and perception studies, and as a result, it has been stated that they are suitable for use in visual evaluation studies. Similarly, in this study, photographs were used to achieve the goal.

Photographs were taken in 8 different public interiors. These places are shopping center, city hole, hospital, school, post office, courthouse, governer's building, and main train station. While taking photographs, attention was paid to viewing the areas from different angles and increasing perceptibility. In the final stage, the photographs were processed in Adobe Photoshop CS6 program to include kokedama visuals containing different features of design elements and principles Figure 2.

Another important material of the study is the subjects who were surveyed. In this research, where an average of 300 people graduated annually from different faculties with basic design education, the sample size was calculated as 160 people with 95 percent confidence [32]. 160 subjects who received basic design education in different faculties were divided into 4 groups as "architecture, fine arts, agriculture and forest" according to the names of the faculties they studied.

The survey applied within the scope of the study consists of two parts: The section containing questions regarding the determination of the user profile and the section containing the criteria that are given points to determine the perception of space. IBM SPSS Statistics 25 program was used to evaluate the survey data.

In order to make a comparative analysis of the surveys answered by 4 groups regarding photographs of public interiors, the Likert method was used, as in the studies of Cakci [31], Dincer [33]. In the scoring scale, 5 points are interpreted as very effective and 1 point is interpreted as not at all effective. In addition, one-way Anova (Single Factor Analysis of Variance) was used to evaluate the survey data. One-way analysis of variance is used to calculate the significance of the difference between three or more independent averages in a normally distributed series. In this context, it is aimed to measure the differences in the perceptions of designers who have received basic design education in different faculties regarding complexity, readability, consistency, mystery-attraction, simplicity, perceptibility and structure/identity criteria in interior spaces where kokedama is used. Finally, Pearson correlation analysis was used to measure the degree of impact of the criteria on each other. The results from these analyzes were used to explain the hypotheses. Correlation analysis is a term used to indicate the relationship between two (or more) quantitative variables. This analysis measures the "strength" or "extent" and direction of the relationship between variables [34].

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Figure 2.
Views from 8 different public interiors where kokedama was applied.

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3. Findings and Discussion

User profiles were determined according to the data obtained from the surveys and are given in Table 1. Accordingly, in the study, where 66.3 percent were female and 33.8 percent male participants, it was seen that the highest participation was from the forestry faculty and the least participation was from the architecture faculty. Table 1 also shows descriptive element data expressing the average, minimum and maximum score values and standard deviation and standard error amounts received by the areas according to the results of the spatial perception title of 8 public areas with kokedama elements.

Table 1.
Descriptive statistics of gender and faculty.

Gender		**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**			
Valid	Woman	106	66.3	66.3	66.3			
	man	54	33.8	33.8	100.0			
	total	160	100.0	100,0				
Faculty		Frequency	Percent	Valid percent	Cumulative percent			
Valid	Forestry	49	30.6	30.6	30.6			
	architecture	31	19.4	19.4	50.0			
	fine arts	33	20.6	20.6	70.6			
	agriculture	47	29.4	29.4	100.0			
	total	160	100.0	100.0				
	N	**Mean**	**Std. deviation**	**Std. error**	**95% confidence interval for mean**		**Min.**	**Max.**
					Lower bound	**Upper bound**		
1.00	160	3.1098	0.66278	0.05240	3.0063	3.2133	1.00	5.00
2.00	160	3.2411	0.63549	0.05024	3.1418	3.3403	1.00	5.00
3.00	160	3.1500	0.83864	0.06630	3.0191	3.2809	1.00	5.00
4.00	160	3.0286	0.79107	0.06254	2.9051	3.1521	1.00	5.00
5.00	160	2.8116	0.82438	0.06517	2.6829	3.9403	1.00	5.00
6.00	160	2.9509	0.83991	0.06640	2.8198	3.0820	1.00	5.00
7.00	160	2.9313	0.75286	0.05952	2.8137	3.0488	1.00	5.00
8.00	160	3.2107	0.89019	0.07038	3.0717	3.3.3497	1.00	5.00

1.Shopping Center, 2. City Hall, 3. Hospital, 4. School, 5. Post Office, 6. Court House, 7. Governor's Building, 8. Main Train Station

When we look at the fields in terms of general average scores, it is seen that field number 2 has the highest general average score and field number 5 has the lowest general average score, as shown in Table 2. Area number 2 has the highest general average with 3.2411 points, and area number 5 has the lowest general average with 2.8116 points.

In Table 2, the scores of the areas whose photographs were scored in terms of each criterion according to the spatial perception evaluation criteria and their distribution among designers who received basic design education in different faculties are given. Accordingly, it is seen that the sample areas received at least 1 and at most 5 points in terms of each criterion.

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Table 2.
Table of descriptive elements according to spatial perception criteria.

		N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min.	Max.
						Lower bound	Upper bound		
C1	Forestry	49	3.3648	0.85041	0.12149	3.1205	3.6091	1.00	5.00
	Architecture	31	3.1331	0.56175	0.10089	2.9270	3.3391	1.00	5.00
	Fine arts	33	3.9167	0.83190	0.14482	3.6217	4.2116	1.00	5.00
	Agriculture	47	2.8936	0.86248	0.12581	2.6404	3.1469	1.00	5.00
	Total	160	3.2953	0.87567	0.06923	3.1586	3.4320	1.00	5.00
C2	Forestry	49	2.6020	0.65634	0.09376	2.4135	2.7906	1.00	5.00
	Architecture	31	2.3185	0.63806	0.11460	2.0845	2.5526	1.00	5.00
	Fine arts	33	2.1780	1,01408	0.17653	1.8185	2.5376	1.00	5.00
	Agriculture	47	2.3431	0.72347	0.10553	2.1307	2.5555	1.00	5.00
	Total	160	2.3836	0.76814	0.06073	2.2637	2.5035	1.00	5.00
C3	Forestry	49	2.1697	0.59671	0.08996	2.3967	2.8046	1.00	5.00
	Architecture	31	2.2936	0.62644	0.14597	2.1674	2.5657	1.00	5.00
	Fine arts	33	3.0895	1,05064	0.20087	1.8264	2.4957	1.00	5.00
	Agriculture	47	2.3397	0.69787	0.11069	2.2047	2.4937	1.00	5.00
	Total	160	2.4108	0.77215	0.05985	2.2567	2.4982	1.00	5.00
C4	Forestry	49	2.5077	0.69476	0.09925	2.3081	2.7072	1.00	5.00
	Architecture	31	2.4597	0.54619	0.09810	2.2593	2.6600	1.00	5.00
	Fine arts	33	3.2727	0.74769	0.13016	3.0076	3.5378	1.00	5.00
	Agriculture	47	2.4973	0.92867	0.13546	2.2247	2.7700	1.00	5.00
	Total	160	2.6531	0.81529	0.06445	2.5258	2.7804	1.00	5.00
C5	Forestry	49	3.2806	0.60839	0.08691	3.1059	3.4554	1.00	5.00
	Architecture	31	2.9435	0.57449	0.10318	2.7328	3.1543	1.00	5.00
	Fine arts	33	4.0379	0.81997	0.14274	3.7471	4.3286	1.00	5.00
	Agriculture	47	2.6755	0.89521	0.13058	2.4127	2.9384	1.00	5.00
	Total	160	3.1938	0.88486	0.06995	3.0556	3.3319	1.00	5.00
C6	Forestry	49	3.6122	0.72270	0.10324	3.4047	3.8198	1.00	5.00
	Architecture	31	3.1532	0.48057	0.08631	2.9770	3.3295	1.00	5.00
	Fine arts	33	4.0758	0.67744	0.11793	3.8355	4.3160	1.00	5.00
	Agriculture	47	2.9229	0.78866	0.11504	2.6913	3.1544	1.00	5.00
	Total	160	3.4164	0.81309	0.06428	3.2895	3.5434	1.00	5.00
C7	Forestry	49	3.4311	0.77563	0.11080	3.2083	3.6539	1.00	5.00
	Architecture	31	3.1573	0.68691	0.12337	2.9053	3.4092	1.00	5.00
	Fine arts	33	3.9886	0.71011	0.12361	3.7368	4.2404	1.00	5.00
	Agriculture	47	2.8564	0.79485	0.11594	2.6230	3.0898	1.00	5.00
	Total	160	3.3242	0.84864	0.06709	3.1917	3.4567	1.00	5.00

C: Criterion

C1: Readability **C2:** Consistency-suitability **C3:** Complexity C4: Mystery-attraction **C5:** Structure-identity **C6:** Perceptibility **C7:** Simplicity

When Table 2 is examined in terms of all criteria, it is seen that the highest average score was given to the perceptibility criterion by the fine arts faculty, and the lowest score was given to the consistency-suitability and complexity criteria by the fine arts faculty.

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Table 3 shows the differences between the evaluation levels of designers who received basic design education in different faculties in terms of each criterion, according to the spatial perception evaluation criteria. Accordingly, a significant and statistically explainable relationship was found between the scores given to the criteria of readability, complexity, mystery-attraction, structure-identity, perceptibility and simplicity.

In order to explain in detail what kind of relationship these differences have between representatives of different faculties, the Tukey test was used and the differences between faculties regarding each evaluation criterion were revealed.

Table 3.
Anova table of spatial perception evaluation criteria.

		Sum of squares	df	Mean square	F	Sig.
C1	Between groups	21.377	3	7.126	11.056	0.000
	Within groups	100.544	156	0.645		
	Total	121.921	159			
C2	Between groups	3.941	3	1.314	2.280	0.082
	Within groups	89.875	156	0.576		
	Total	93.816	159			
C3	Between groups	5.819	3	2.085	4.308	0.071
	Within groups	80.736	156	0.467		
	Total	99.702	159			
C4	Between groups	16.007	3	5.336	9.281	0.000
	Within groups	89.679	156	0.575		
	Total	105.686	159			
C5	Between groups	38.446	3	12.815	23.234	0.000
	Within groups	86.047	156	0.552		
	Total	124,494	159			
C6	Between groups	29.821	3	9.940	20.595	0.000
	Within groups	75.295	156	0.483		
	Total	105.116	159			
C7	Between groups	26.279	3	8.760	15.488	0.000
	Within groups	88.230	156	0.566		
	Total	114.509	159			

C: Criterion

C1: Readability **C2:** Consistency-suitability **C3:** Complexity C4**:** Mystery-attraction **C5:** Structure-identity C**6:** Perceptibility **C7:** Simplicity

Accordingly, Table 4 shows the Tukey table examining the relationship between the readability element, one of the evaluation criteria for spatial perception, and the differences between faculties. According to the table, the differences between the evaluation levels of those who received basic design education at the faculty of fine arts and those who received their education at the faculty of forestry, agriculture and architecture are significant, positive and can be explained statistically. Accordingly, representatives of the fine arts faculty evaluated the readability element at a higher score than the other three faculties. In addition, the evaluation difference between the faculty of agriculture and the faculty of forestry was found to be significant, but this difference was negative, that is, representatives of the faculty of agriculture gave lower scores than the representatives of the faculty of forestry in their evaluation in terms of the readability criterion. Apart from these significant differences, the evaluation differences between other pairwise comparisons were not found to be significant and could not be explained statistically. According to the table, it is seen that the highest average difference between the significant differences is between the representatives of the faculty of fine arts and agriculture (1.02305),

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and the lowest average difference is between the representatives of the faculty of forestry and agriculture (0.47118).

Table 4.
Spatial perception – readability criterion Tukey table.

(I) Faculty	(J) Faculty	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Forestry	Architecture	0.23173	0.18424	0.591	-0.2467	0.7102
	Fine arts	-0.55187*	0.18079	0.014	-1.0214	-0.0824
	Agriculture	0.47118*	0.16391	0.024	0.0455	0.8968
Architecture	Forestry	-0.23173	0.18424	0.591	-0.7102	0.2467
	Fine arts	-0.78360*	0.20080	0.001	-1.3051	-0.2621
	Agriculture	0.23945	0.18575	0.571	-0.2429	0.7218
Fine arts	Forestry	0.55187*	0.18079	0.014	0.0824	1.0214
	Architecture	0.78360*	0.20080	0.001	0.2621	1.3051
	Agriculture	1.02305*	0.18233	0.000	0.5496	1.4965
Agriculture	Forestry	-0.47118*	0.16391	0.024	-0.8968	-0.0455
	Architecture	-0.23945	0.18575	0.571	-0.7218	0.2429
	Fine arts	-1.02305*	0.18233	0.000	-1.4965	-0.5496

Source: *. The mean difference is significant at the 0.05 level.

Table 5 shows the Tukey table, which examines the relationship between faculties and their differences in terms of the mystery-attraction element, which is one of the spatial perception evaluation criteria. According to the table, the differences between the evaluation levels of the representatives of the fine arts faculty and the representatives of the faculty of agriculture, faculty of architecture and faculty of forestry are significant and positive. Accordingly, fine arts faculty evaluated the mystery-attraction element at a higher score than all other faculties. Apart from these, the evaluation differences between any pairwise comparisons were not found to be significant and could not be explained statistically. According to the table, it is seen that the highest average difference among those found to be significant is between fine arts and architecture faculty (0.81305), and the lowest average difference is between fine arts and forestry faculty (0.76507).

Table 5.
Spatial perception – mystery-attraction criterion Tukey table.

(I) Faculty	(J) faculty	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Forestry	Architecture	0.04798	0.17400	0.993	-0.4039	0.4998
	Fine arts	-0.76507*	0.17074	0.000	-1.2085	-0.3217
	Agriculture	0.01031	0.15480	1.000	-0.3917	0.4123
Architecture	Forestry	-0.04798	0.17400	0.993	-0.4998	0.4039
	Fine arts	-0.81305*	0.18964	0.000	-1.3055	-0.3206
	Agriculture	-0.03766	0.17543	0.996	-0.4932	0.4179
Fine arts	Forestry	0.76507*	0.17074	0.000	0.3217	1.2085
	Architecture	0.81305*	0.18964	0.000	0.3206	1.3055
	Agriculture	0.77539*	0.17220	0.000	0.3282	1.2226
Agriculture	Forestry	-0.01031	0.15480	1.000	-0.4123	0.3917
	Architecture	0.03766	0.17543	0.996	-0.4179	0.4932
	Fine arts	-0.77539*	0.17220	0.000	-1.2226	-0.3282

Source: *. The mean difference is significant at the 0.05 level.

Table 6 shows the Tukey table examining the relationship between the structure-identity element, one of the spatial perception evaluation criteria, and the differences between faculties. According to the table, the differences between the evaluation levels of fine arts faculty, agriculture faculty, architecture faculty and forestry faculty are significant and positive. Fine arts faculty evaluated the structure-identity element at a higher score than all other faculties. In addition, the difference between the evaluations of the faculty of forestry and agriculture is significant and positive. In this context, the faculty of forestry evaluated the structure-identity element at a higher score than the faculty of agriculture. According to the table, it is seen that the highest average difference between the significant differences is between the faculty of fine arts and agriculture (1.36235), and the lowest average difference is between the faculty of Forestry and agriculture (0.60508).

Table 6.
Spatial perception and structure-identity criterion Tukey table.

(I) Faculty	(J) Faculty	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Forestry	Architecture	0.33706	0.13491	0.086	-0.0287	0.7029
	Fine arts	-0.75727*	0.16712	0.000	-1.2133	-0.3012
	Agriculture	0.60508*	0.15686	0.001	0.1820	1.0282
Architecture	Forestry	-0.33706	0.13491	0.086	-0.7029	0.0287
	Fine arts	-1.09433*	0.17613	0.000	-1.5742	-0.6144
	Agriculture	0.26802	0.16643	0.508	-0.1816	0.7176
Fine arts	Forestry	0.75727*	0.16712	0.000	0.3012	1.2133
	Architecture	1.09433*	0.17613	0.000	0.6144	1.5742
	Agriculture	1.36235*	0.19346	0.000	0.8391	1.8856
Agriculture	Forestry	-0.60508*	0.15686	0.001	-1.0282	-0.1820
	Architecture	-0.26802	0.16643	0.508	-0.7176	0.1816
	Fine arts	-1.36235*	0.19346	0.000	-1.8856	-0.8391

Source: *. The mean difference is significant at the 0.05 level.

Table 7 shows the Tukey table examining the relationship between the perceptibilit element, one of the spatial perception evaluation criteria, and the differences between faculties. According to the table, the differences between the evaluation levels of fine arts faculty and agriculture, architecture and forestry faculty are significant and positive. Fine arts faculty evaluated the perceptibility element at a higher score than all other faculties. According to the table, only the differences between forestry faculty and other faculties were found to be significant. In addition to these significant differences, the differences between the evaluation levels of forestry faculty and agriculture, forestry and architecture faculty are also significant and positive. According to the table, it can be seen that the highest average difference between the significant differences is between the fine arts and agriculture faculty (1.15289), and the lowest average difference is between the Forestry and fine arts faculty (0.45902).

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Table 7.
Spatial perception - perceptibility criterion tukey table.

(I) Faculty	(J) faculty	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Forestry	Architecture	0.45902*	0.15944	0.023	0.0450	0.8731
	fine arts	-0.46351*	0.15645	0.018	-0.8698	-0.0572
	agriculture	0.68937*	0.14184	0.000	0.3210	1.0577
Architecture	Forestry	-0.45902*	0.15944	0.023	-0.8731	-0.0450
	fine arts	-0.92253*	0.17377	0.000	-1.3738	-0.4713
	agriculture	0.23035	0.16075	0.481	-0.1871	0.6478
Fine arts	Forestry	0.46351*	0.15645	0.018	0.0572	0.8698
	architecture	0.92253*	0.17377	0.000	0.4713	1.3738
	agriculture	1.15289*	0.15778	0.000	0.7431	1.5626
Agriculture	Forestry	-0.68937*	0.14184	0.000	-1.0577	-0.3210
	architecture	-0.23035	0.16075	0.481	-0.6478	0.1871
	fine arts	-1.15289*	0.15778	0.000	-1.5626	-0.7431

Source: *. The mean difference is significant at the 0.05 level.

Table 8 shows the Tukey table examining the relationship between the simplicity element, one of the spatial perception evaluation criteria, and the differences between faculties. According to the table, the differences between the evaluation levels of fine arts faculty and agriculture, architecture and forestry faculty are significant and positive. In addition, the differences between the evaluation levels of agriculture faculty and forestry faculty are significant but negative. According to the table, it is seen that the highest average difference between the significant differences is between fine arts and agriculture faculty (1.13225), and the lowest average difference is between fine arts and forestry faculty (0.55751).

Table 8.
Spatial perception - simplicity criterion Tukey table.

(I) Faculty	(J) faculty	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Forestry	Architecture	0.27386	0.17259	0.389	-0.1743	0.7221
	Fine arts	-0.55751*	0.16936	0.007	-0.9973	-0.1177
	Agriculture	0.57474*	0.15354	0.001	0.1760	0.9735
Architecture	Forestry	-0.27386	0.17259	0.389	-0.7221	0.1743
	Fine arts	-0.83138*	0.18810	0.000	-1.3199	-0.3429
	Agriculture	0.30088	0.17401	0.312	-0.1510	0.7528
Fine arts	Forestry	0.55751*	0.16936	0.007	0.1177	0.9973
	Architecture	0.83138*	0.18810	0.000	0.3429	1.3199
	Agriculture	1.13225*	0.17080	0.000	0.6887	1.5758
Agriculture	Forestry	-0.57474*	0.15354	0.001	-0.9735	-0.1760
	Architecture	-0.30088	0.17401	0.312	-0.7528	0.1510
	Fine arts	-1.13225*	0.17080	0.000	-1.5758	-0.6887

Source: *. The mean difference is significant at the 0.05 level.

In order to explain that the use of kokedama contributes positively to spatial perception, the degree of influence of the criteria on each other was measured. For this reason, Pearson correlation analysis was used. According to Table 9, it was found that there was a significant and positive relationship between the perceptibility (C6) criterion and all other criteria, and between the simplicity (C7) criterion and all other criteria. The increase in the value of these two criteria also increases the value of the other

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criteria. It was found that there was a significant but negative relationship only between the perceptibility (C6) criterion and the complexity (C3) criterion, and between the simplicity (C7) criteria and the complexity (C3) criterion (r: .190, p<0.05), (r: .262). , p<0.01). As the value of perceptibility and simplicity increases, complexity decreases. This data explains that the use of kokedama contributes positively to spatial perception. The criteria that have the most impact when found together are structure/identity and perceptibility criteria, r: .811, p<0.001.

Table 9.
Pearson correlation analysis.

Descriptive statistics								
	Mean	**Std. deviation**	**N**					
C1	3.2828	0.86540	160					
C2	3.1484	0.83508	160					
C3	2.3859	0.76869	160					
C4	2.6531	0.81529	160					
C5	3.1852	0.87875	160					
C6	3.4078	0.80614	160					
C7	3.3156	0.84871	160					

Correlations

		C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**
C1	Pearson correlation	1	0.719(**)	-0.076	0.440(**)	0.652(**)	0.754(**)	0.618(**)
	Sig. (2-tailed)		0.000	0.340	0.000	0.000	0.000	0.000
	N	160	160	160	160	160	160	160
C2	Pearson correlation	0.719(**)	1	-0.112	0.477(**)	0.742(**)	0.774(**)	0.745(**)
	Sig. (2-tailed)	.000		0.160	0.000	0.000	0.000	.000
	N	160	160	160	160	160	160	160
C3	Pearson correlation	-0.076	-0.112	1	0.016	-0.143	-0.190(*)	-0.262(**)
	Sig. (2-tailed)	0.340	0.160		0.841	0.072	0.016	0.001
	N	160	160	160	160	160	160	160
C4	Pearson correlation	0.440(**)	0.477(**)	0.016	1	.625(**)	0.463(**)	0.439(**)
	Sig. (2-tailed)	0.000	0.000	0.841		.000	0.000	0.000
	N	160	160	160	160	160	160	160
C5	Pearson correlation	0.652(**)	0.742(**)	-0.143	0.625(**)	1	0.811(**)	0.719(**)
	Sig. (2-tailed)	0.000	0.000	0.072	0.000		0.000	0.000
	N	160	160	160	160	160	160	160
C6	Pearson correlation	0.754(**)	0.774(**)	-0.190(*)	0.463(**)	.811(**)	1	0.777(**)
	Sig. (2-tailed)	0.000	0.000	0.016	0.000	0.000		0.000
	N	160	160	160	160	160	160	160
C7	Pearson correlation	0.618(**)	0.745(**)	-0.262(**)	0.439(**)	0.719(**)	0.777(**)	1
	Sig. (2-tailed)	0.000	0.000	0.001	0.000	0.000	0.000	
	N	160	160	160	160	160	160	160

Note: ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

C: Criterion

C1: Readability **C2:** Consistency-suitability **C3:** Complexity C4**:** Mystery-attraction **C5:** Structure-identity **C6:** Perceptibility **C7:** Simplicity

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Tanrıkut [35], in his study investigating the effect of design elements on space, found that the color effect increases the perceptibility in the space. Similarly, in this study, it was found that the use of kokedama increases perceptibility because kokedama will create a color effect in the area. Similar to the results of this study, Yerli and Kaya [36] mentioned that the use of plant materials in the interior will increase the function and aesthetics of the space. A study conducted by Mitaria [37] showed that users from different age groups found kokedama cheerful, peaceful and calm. One of the similar results of this study is that the use of kokedama indoors contributes positively to spatial perception. In their study, Serpa and Muhar [38] investigated the effect of plant size, texture and color on spatial perception outdoors. Similar to this study, they conducted a survey by showing photos to 129 people. However, very different from this study, they found that some of the important factors that create differences in spatial perception are demographic factors such as geographical and social origin and gender. Contrary to this study, Ozbilen and Kalin [39] did not find statistically significant results in plant-space cross-tabulation in their study, and they explained the reason for this as a result of the difference in people's cultural formations and values. As if referring to this study, they suggested that, due to the uncertainty in people's aesthetic preferences, the general conclusion of their study was that the plants they examined within the scope of the study could be useful in showing the meaning of certain buildings and spaces with various planting design variations. Yeom and Lee [40] tried to measure the perception of space by conducting a landscape simulation experiment. The results of the study are consistent with our study and showed that spatial perception may vary depending on the planting design. It has been found that plant species play an important role in increasing the perception of space and landscape quality, and in providing positive emotions such as spaciousness, warmth and naturalness. He suggested that planting design should focus on the style and types of planting rather than the volume of greenery.

4. Results

As a result of spatial perception evaluations, perceptibility, structure-identity, simplicity, readability and mystery-attraction criteria attracted attention. In this context, it has been observed that kokedama designs with high levels of readability and perceptibility add structure-identity to the space. However, it has been concluded that kokedama designs serve as an interesting object in the space and increase the perception of space.

Based on the consistency / suitability criterion of kokedama applications from the spatial perception criteria, it has been determined that the most suitable areas for kokedama applications are areas 1, 3, 4, 7 and 8 (Shopping Center, Hospital, School, Governor's Building and Main Train Station).

Hypothesis 1 has been confirmed: According to tables, there are significant differences between the spatial perceptions of designers trained in different faculties.

Hypothesis 2 has been confirmed: According to Table 9, kokedamas increase the spatial perception in their environment and add identity to the space. The use of kokedama reduces complexity and increases perceptibility.

In order to increase the perception of space, kokedama applications to be used in public buildings should be uncomplicated, simple, perceptible, readable, consistent / suitable and attractive. According to the study results, the structure-identity criterion is highly related to the perception of space. For this reason, when designing kokedama items, care should be taken to ensure that the kokedama element can add identity to the space.

According to the data obtained from the tables, those who gave the highest score on the criteria affecting spatial perception were graduates of the faculty of fine arts, while those who gave the lowest score were graduates of the faculty of agriculture. Although both received basic design education, there are differences between the spatial perceptions of designers who graduated from these two faculties.

According to the results of the study, the increase in the value of the perceptibility and simplicity criteria also increases the value of other criteria. Another important and practical result is that as the value of perceptibility and simplicity increases, there is a decrease in the perception of complexity. This data explains that the use of kokedama makes a positive contribution to spatial perception. The criteria that have the most effect when they are found together are the structure/identity and perceptibility criteria.

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