

Aesthetic Differences between Freshmen and Pre-architects

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ABSTRACT

This paper demonstrates how architectural representations can be used to identify both differences and commonalities in the way first-year architecture students – as freshmen – and fourth-year architecture students – as pre-architects – perceive the discipline of architecture. It is believed that, depending on the subjects' level of learning, the meaning given to architectural appearances can differ. Using multiple sorting techniques, respondents were asked to sort 21 examples of contemporary architecture according to their own criteria. The multi-dimensional scaling analysis has shown that both the freshmen and the pre-architects were homogeneous in their thinking, showing high inter-individual agreement within the group. However, some individuals in the freshman group were closer to those of pre-architects than other freshmen. By indicating the possibility of having students who are more interested than their classmates, the research points out the risk of treating first year students as strictly unknowledgeable laypersons.

Key Words: *Freshmen, pre-architects, Meaning, Knowledge structures.*

1. INTRODUCTION

Cultural tastes are largely shaped through knowledge and it is believed that environmental meanings are constructed through codes or 'knowledge structures' that are socially transmitted and based on learning and culture [1]. Such differences in knowledge structures have been particularly evident in studies contrasting expert/non-expert evaluations of environmental stimuli [2-6]. In turn, architects typically develop their knowledge structures around 'prototypical' buildings, which are different from

those used by non-architects [7]. Their distinctive attitudes are most likely derived from shared values acquired in their education and it is now well established that design professionals hold a different system of constructs through which they understand and evaluate the environment.

Gifford et al. [8] have investigated the differences between architects and laypersons, with participants assessing the global aesthetic quality and six key

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cognitive properties (complexity, clarity, friendliness, originality, meaningfulness, and ruggedness) of 42 large contemporary buildings and then independently scoring 59 physical features of each building. Lens model analyses revealed how these physical features were interpreted differently by the two groups, leading the participants of the study to experience different cognitive properties, which in turn led to different aesthetic conclusions. Thus, in terms of the cues examined in this study, architects and laypersons base their pleasure ratings on entirely different sets of physical cues. Interestingly, for architects, pleasure was significantly related to the presence in facades of more metal cladding, fewer arches, and more railings. Architects were more aroused by buildings that had more rounded edges and corners, and more triangular elements.

Hershberger [9], for example, provided early empirical evidence that architects and non-architects perceive physical settings in fundamentally different ways. He compared the semantic differential ratings of buildings by three groups (architects, pre-architects, and laypersons) and found that the architects differed significantly from the other two groups. In his classic study of the impacts of architectural training, Hershberger suggested that experts respond more to *representational*, physical meanings of architecture, whereas lay groups respond more to *responsive*, ethno-demographic meanings. He attributed these differences primarily to training and experience.

Devlin [10] compared users,' viewers,' and architects' perceptions of two Chicago office buildings and concluded that architects are more likely to evaluate buildings according to stylistic and formal category systems, while nonarchitects typically rely on functional categories. Nonarchitects tended to provide evaluations that were predominantly descriptive, whereas architects provided evaluations that were more abstract and conceptual. Similarly, Groat [11] used a sorting task to determine categories that architects and laypersons use to interpret buildings. According to her findings, laypeople tended to sort buildings on the basis of preference and type, whereas architects used categories such as design quality, form, style, and historic significance. Architects could clearly distinguish between modern and postmodern designs, whereas the lay group could not.

A study in the UK by Wilson [12] has shown some dramatic changes in visual preferences of architectural students within schools of architecture during five different stages of architectural education. As Wilson explains, during the course of architectural education, students develop increasingly abstract and more differentiated concepts, which become more complex with increasing length of education. As Wilson suggests, there are two distinctly different systems of construct under consideration: conceptualization and evaluation. The first is a system of concepts with which to organize and understand architecture that is essentially descriptive, objective, and nonevaluative, while the second guides subjective evaluative judgments.

It has been assumed that the concepts used by architects are developed during the period of training, and Wilson and Canter [13] have made visible the conceptual transformation that occurs across each year of professional training. Seventy-five students in each year

of the five-year architectural training were asked to sort 26 examples of contemporary architecture according to their own, elicited constructs. The development of architectural concepts during professional education is examined using the multiple sorting procedures. The multidimensional scalogram analysis of each year group's categorizations of the buildings reveals that, during the course of architectural education, students develop increasingly abstract and more differentiated concepts to organize their knowledge. The most central concept used to organize their understanding is architectural style, a concept that becomes more complex in its definition with increasing length of education.

In his research, Downing [7] defines an image bank as the accumulation of an architectural designer's mental imagery of memorable past-place experience. The research studied the image bank of 117 individuals in two separate studies: 38 were professional architects, 38 were architectural graduate students exiting professional education, and 41 were architecture students who had just entered professional education. It was assumed that the memorable places encountered by the individual as a youth (before entering professional education) were primarily informal in nature. In general, most of these memorable place experiences could be characterized as indicative of popular, common, or vernacular settings rather than what might be considered 'designed' or 'high' architecture. As Downing mentions, during their years of education, young designers tend to shift their memorable imagery from concrete, physical to more complex, abstract imagery. During this period of any designer's lifetime, training in more analytic responses to the nature of places is commonly introduced, including principles of form, space, and order. In turn, even if vernacular architecture is admired, it is most likely thought of or analyzed through the student's filters or learned assessments or judgments as well as personal impressions.

Hubbard [1] investigates differences in architectural interpretation between planners, planning students, and public respondents. The interpretations were examined using multiple sorting techniques, with respondents asked to sort 15 examples of contemporary architecture according to their own criteria. INDSICAL analysis of the data facilitated the recognition of a shared conceptualization of the architectural stimuli, but it also demonstrated a number of important intergroup and inter-individual differences in architectural interpretation.

Actually, this paper investigates particularly the differing interpretations of the students at the early stages of architectural education as freshmen and the last-year students as pre-architects. It is believed that the meaning given to architectural appearances can differ, depending on the subjects' 'learning' i.e., 'knowledge structures'. Typically, during the process of education, mental images collected in students' brains through books, journals, lectures, and course work can change. It has been assumed that, on account of their distinctive training and world view, the pre-architects would tend to adhere to different representations of the architectural stimuli than those for the freshmen. As suggested in this work, sensations (mental impressions or the consciousness of impressions) are received through an initial image (the first mental picture that forms after exposure to an

architectural space not seen before) [14]. In the initial image, these sensations basically concern the tangible features that stimulate the personal impressions (those features that make a space distinctive or distinguishing: color, light, form, material, etc.) that are unlike those perceptions received through the ‘actual image’ [14,15]. Nasar [16] defines these two images as *formal aesthetics* (structure of forms) and *symbolic aesthetics* (content of forms).







For architecture, style represents an important symbolic variable [17]. As we learn the same or similar formal structures, we recognize them internally in terms of similarities and dissimilarities. The learnt case reflects the individual’s internal representation of the building and meanings associated with that representation and building. Different from other works, the current study shows that there is not only a greater similarity of aesthetic evaluation among professional designers, but also that the freshmen might share similar aesthetic judgment, or homogeneity in judgment. The aim was to show the possibility of having freshmen with a higher awareness of architectural knowledge structures, and it is believed that it pointed out the risk of treating first year students as unknowledgeable laypersons. Thus, the current study emphasizes the importance of using an




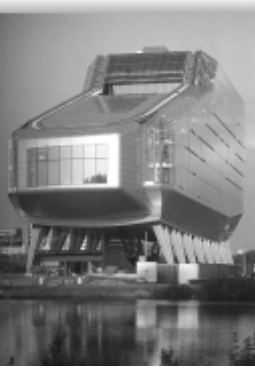



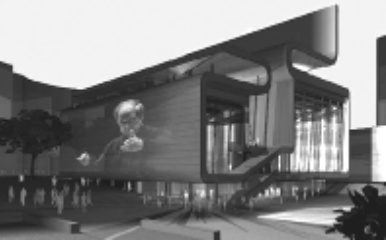




appropriate methodological framework for analyzing both commonalities and differences between the perceptions of different groups concerning their architectural education.

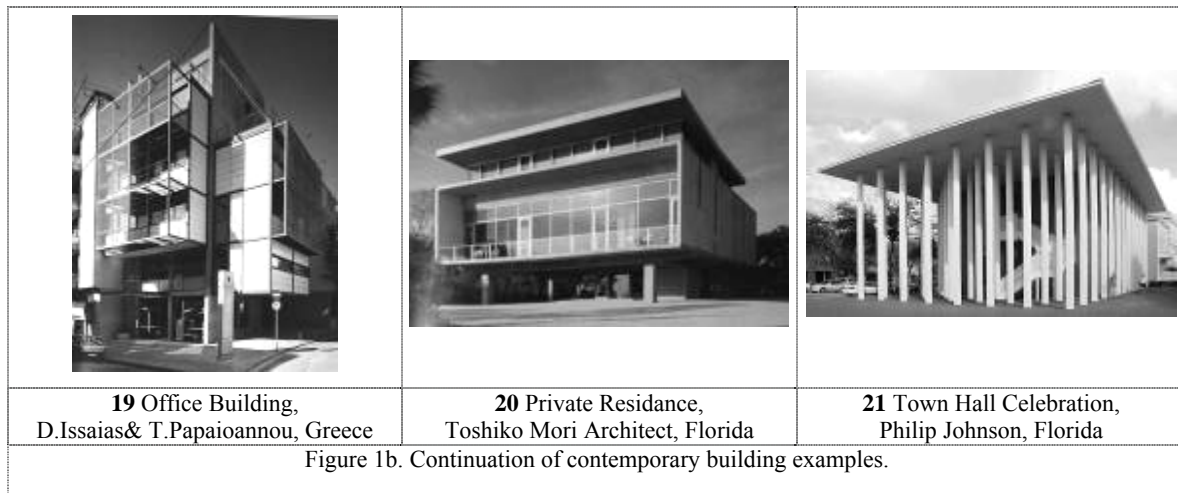
2. METHOD

2.1. Research Setting

Essentially the research focused on in-depth interviews (typically of 1-h duration) that examined respondents’ interpretations of 21 contemporary buildings (Figure 1a-b). These 21 schemes, built between the late 1990s and the early 2000s, were selected from different building developments completed in different countries and built by different architects. These 21 buildings were selected because of their similarities in size and height. Additionally, they had been taken from a similar view angle—from the front view or left front corner of the building. Each building has different functions (office, house, embassy, town hall, institute of modern art, drugstore, mixed-use building, city hall, headquarters, city of arts and sciences, music center, cinema center, university library, bank). So as not to affect the respondents’ color preferences, the images were taken in black-and-white on A5 size (148×210 mm²), good-quality paper.

		
1 Institute of Modern Art, Erick van Egeraat, Middlesbrough	2 London City Hall, Norman Foster, London	3 City of Arts and Sciences, Santiago Calatrava, Valencia
		
4 Publicis Drugstore, Michele Saee Studio, Paris	5 Dancing House, Frank Gehry, Prague	6 Embassy of Mexico, Francisco Serrano, Berlin

		
<p>7 Villa VPRO, MVRDV, Hilversum</p>	<p>8 Rosenthal Center, Zaha Hadid, Ohio</p>	<p>9 Riverwalk Kitakyushu, Jerde Partnership, Kitakyushu</p>
<p>Figure 1a. Contemporary building examples.</p>		
		
<p>10 ING Group Headquarters, Meyer V. Schooten, Amsterdam</p>	<p>11 Gewild Wonen Expo 2001, Flexible housing, UN Studio, Flevoland</p>	<p>12 131 Rue Pelleport Frederic, Frederic Borel Architects, Paris</p>
		
<p>13 UFA Cinema Center, Coop Himmelb(l)au, Dresden</p>	<p>14 The Music Box, Foreign Office Architects, London</p>	<p>15 Wozoco's Apartment, MVRDV, Amsterdam</p>
		
<p>16 University Library, Auer+Weber Architects, Magdeburg</p>	<p>17 Casa Rotonda, Mario Botta, Stabio</p>	<p>18 Wall House, John Hejduk, Groningen</p>



2.2. Participants

Respondents were 83 undergraduate students from the Architecture Department of Selcuk University in Konya, who agreed to participate in the study. Of these, 43 were first-year students (freshmen) and 40 were students in their final years (pre-architects). The samples in each group had a similar diverse distribution by gender: 48% of the respondents were male, 52% were female. The mean age of the respondents was 23.

It is important to mention that during four years of architecture education, the pre-architects have been taught 84 hours (3x28 in the third year) of contemporary architecture lecture, which is the average hour taught at the Turkish Universities.

2.3. Procedure

Overall, at the Turkish Universities, the academic year consists of two semesters each lasting for almost four months. The survey was carried at the end of the second semester term in the June of 2007. Before the case study, a task was carried out to identify the style of each picture. To achieve this, two architectural historians voluntarily sorted the pictures taken from different periodicals and categorized them according to style. However, the questionnaire was given out without any concern about style, meaning the pictures were shown to the respondents in a different order, not in the order of styles. After a brief introduction, 21 architectural images were presented to the respondents one by one for each participant in a different order. They were asked to categorize each, contingent upon their own notion. In simple terms, the respondents were asked to sort the 21 architectural stimuli into groups, according to criteria of their own choosing (there were no restrictions on the number or types of sorts produced). The individuals were then asked to describe and name the separate groups they had formed, as well as the overall theme of their sort (using their own terminology).

2.4. Measures

The questionnaire form used in the work consisted of three parts: the first part being concerned with personal background of the participants (class, age, gender, etc.); the second part consisted of sorting the 21 architectural stimuli into groups according to the criteria chosen by the participants. The individuals were then asked to label the separate groups they had classified using their own terminology, as well as the theme of their sort. The final part consisted of sorting the 21 facade photographs from most liked one to the least liked one.

Multiple sorting procedures primarily were applied to investigate individual interpretations, which could then be appropriate for evidence of commonality and differences. Basically, the research was based on multiple sorting procedures, which is specifically appropriate for recognizing differences in conceptual and categorical images. The third part of the research consisted of 'liking.' That is, each respondent was asked to order all 21 pictures, ranking them from their most liked to their most disliked.

One of the main criticisms of research in environmental psychology is the lack of attention to physical attributes of settings [18], and this multiple sorting procedure enables subjects to express themselves in their own terms [19], unrestrictedly by the limitations of a structured rating format.

3. RESULTS AND DISCUSSION

The analysis investigated whether there were any common or essential concepts underlying the evaluations of 21 architectural stimuli by examining the themes or types of sorts completed by the respondents. This content analysis generally involves the analysis of linguistic material, as interviews. As Hubbard [1] mentions, this content analysis is a procedure whereby verbal transcripts or texts are analyzed in an attempt to systematically identify the most pertinent concepts, precepts, or ideas being communicated. A total of 415 sorts were completed by 83 respondents, all of which could be sorted into 11 categories according to topic similarity or general content (Table 1).

Table 1. Frequency of building category use-intergroup comparison.

	Freshmen (%)	Pre-architects (%)
Distinctive appearance	35.8	8.1
Form/function relationship	21.1	16.1
Details / materials	12.9	5.4
Symmetrical / asymmetrical form	2.0	0.1
Surrounding buildings	2.5	0.4
Details of impression	12.5	23.7
Meanings of design style	1.5	20.8
Semantic conceptions	9.8	14.6
Structural impressions	0.6	4.9
Perceptual design scale	0.5	3.7
Others	0.8	2.2
Total	100	100

The verbal descriptions of the sorts completed by the respondents were given as percentage values (Table 1) to facilitate comparison. A chi-square test performed on this table demonstrated that there was a significant difference in the type of concerns stressed by the last-year and first-year student groups at the 86% confidence interval (chi-square: 51.1; df: 22; $p < 0.001$). The table seems to suggest that, there were different concerns stressed by the groups. The range of categories generated revealed that the constructs elicited were not just based on descriptive, objective characteristics (distinctive appearance, form / function relationship, details / materials, symmetrical / asymmetrical form, surrounding buildings), but also subjective, evaluative judgments (details of impression, meanings of design style, semantic conceptions, structural impressions, and perceptual design scale). Particularly, it appeared that around 75% of the freshmen's sorts were based on concrete, physical imagery. On the other hand, 70% of the pre-architects' sorts were based on abstract and evaluative judgments, essentially what the examples reminded them of and their impression. They provided evaluations that were more conceptual and representational, dealing with physical meaning of architecture.

Thus, the use of multidimensional scaling procedures facilitated further analysis of the pattern of similarity in construct use among the respondents as individuals. The input to this procedure was a data matrix in which all 83 respondents were matched against the 11 construct categories, each respondent recorded as either having used a particular construct or not. A 'classic' non-Euclidean multidimensional scaling analysis was then performed on these data, with the two-dimensional solution explaining 94% of the variation in the data (STRESS=0.115).

The resulting scalogram (see Figure 2) graphically demonstrates the differences between individuals in their constructs. In this plot, each point represents a respondent in the study, and the closer two people appear in the plot, the more similar they were in the criteria they used in their sorting. In other words, the farther apart two

respondents appear, the more dissimilar they were. Examining the plot, it does not appear that there is a clear partition between respondent groups. Nevertheless, according to the analysis, the respondent groups were in different sides of the scalogram as the 43 freshmen had different concerns in their interpretation of architecture than the 40 pre-architects. This implies that the pre-architects tended to use a more varied and idiosyncratic range of criteria for the interpretation of architecture than did the freshmen.

These findings, however, do not support completely what Hubbard [1] and Downing [7] have suggested in their work that there is a greater similarity of aesthetic evaluation among professional designers than among the lay public, with 'value convergence' increasing over the course of professional education. Although Hubbard [1] has treated only the designers as a homogeneous group, the two groups discussed in this work displayed homogeneity in judgment (see Figure 2). The closer two individuals appeared in this plot, the more similar they were in their use of construct categories (STRESS=0.115, $r^2=94\%$). Examining the plot in Figure 2, one can begin to discern that each group's evaluation could be grouped independently, which means that each group had identical aesthetic judgments sorted with different characteristics, i.e., descriptive and evaluative.

However, variation existed within each group. As seen in the results (see Figure 2), some individuals in the freshman group, for instance, had descriptions that were closer to those of pre-architects than other individuals of the freshmen. Wilson [12] explains the possible reasons for the differences in evaluation within the profession personality and environmental experience. It is likely that their exposure to environmental factors (i.e., being already in this field because of their relatives, periodicals, and media), proximity to architecture, or individual concern in this field may be the most important factor underlying their representation and interpretation of architectural stimuli.

The variations in each group recognized in the middle part of Figure 2 were analyzed as to styles that could be grouped during the sorting procedure. The resulting scalogram graphically demonstrates some of the freshmen's close proximity to the pre-architects, those different from the homogeneous group, which totalled 19 students (see Figure 2). Different from those at the bottom, these freshmen seem to construct categories with styles with the help of their pre-college knowledge structures (see Figure 2). Actually, it was apparent that they were different in their evaluations because they could recognize more than two styles. For instance; two of them could group all four styles, six of them could group three styles, and eight of them could group only two of the styles used in the work. The rest out of 19 freshmen could not match any of the styles, but in the analysis, they were close to the pre-architects, as shown in Figure 2. The number of the pre-architects in the middle of the figure, however, was quite less than the number of the freshmen.

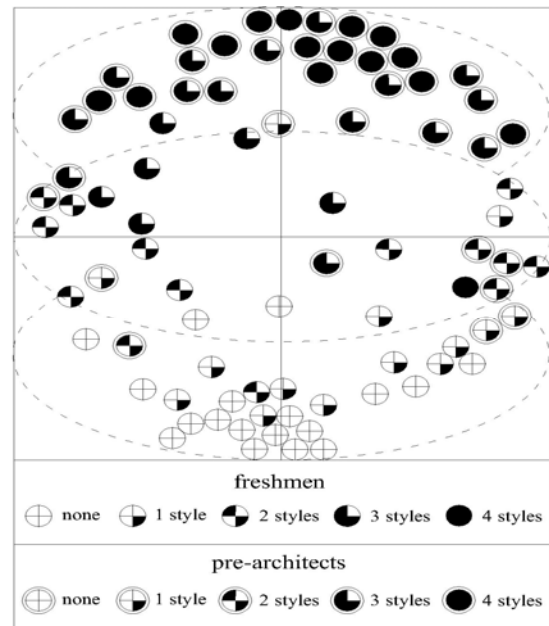


Figure 2. Number of styles grouped.

As mentioned earlier the 21 facade photographs were sorted by the respondents from most liked one to the least liked one. The aim was to consider the correlation between three respondent groups: freshmen (19 students, the ones close to the pre-architects), pre-architects (40 students) and freshmen (24 students in the group). In terms of liking, the freshmen whose evaluations more detailed than their classmates were expected sort the pictures very similar to the pre-architects. In fact, the 19 freshmen's proximity to the pre-architects' knowledge base was obvious when evaluating the stimuli in terms of liking. Except some pictures, the close proximity between them was unmistakable (see Figure 3). Thus, differences in overall interpretation and conceptualization of architectural projects between the two groups result from different aspects of the architectural representation, specifically architectural style as a fundamental factor.

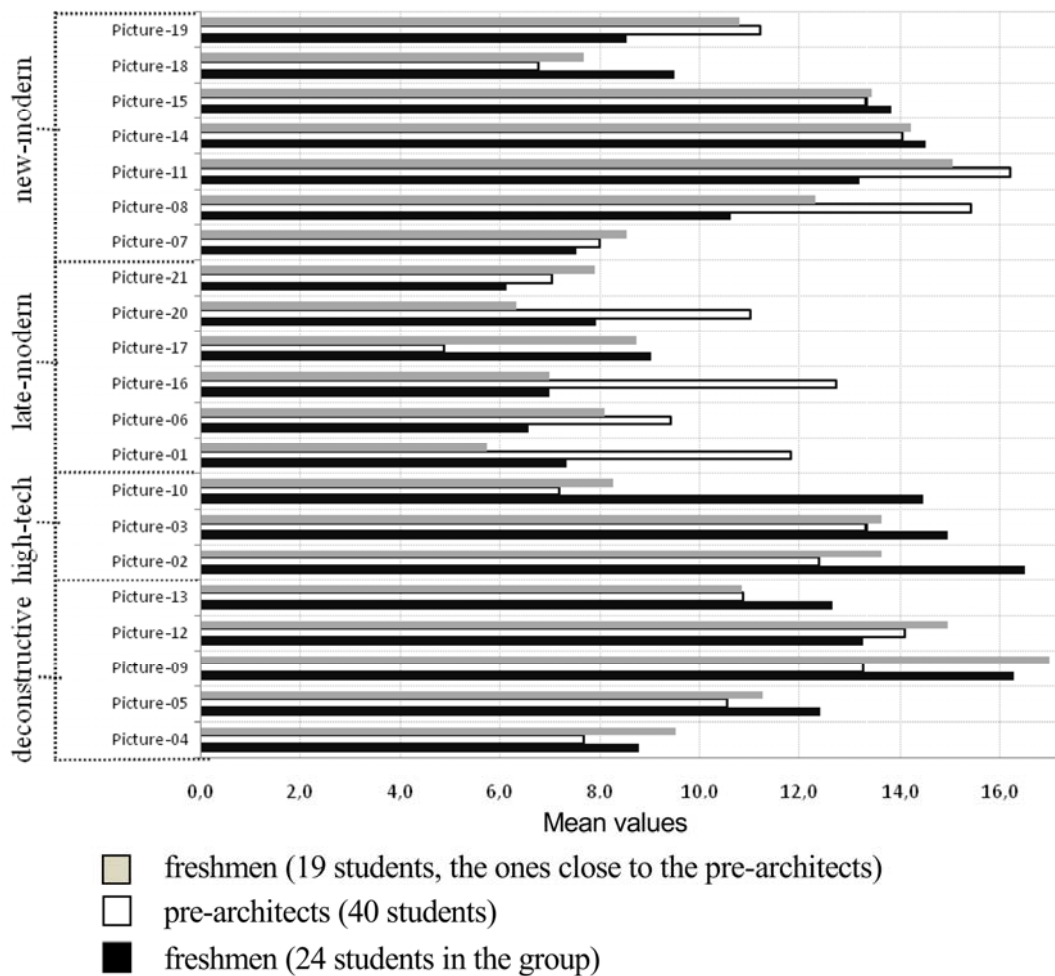


Figure 3. Liking for the freshmen and the pre-architects.

In fact, the pre-architects, after some time of studying architecture had the ability to distinguish each style. Despite the variety of concepts used by the students to explain their choice of grouping buildings, the results have shown that the underlying structure of architectural sorting for pre-architects was based on architectural style. For the pre-architects, the answers given for liking were visibly different than freshmen for some New Modern and Late Modern pictures such as 1, 6, 8, 11, 16, 17, 18, 19, and 20. It was apparent that the freshmen close to the pre-architects were even different in their evaluations. This means that these freshmen recognized the styles of the sample buildings and they were close to the pre-architects when evaluating the pictures in terms of 'liking' (pictures as 2, 3, 5, 6, 11, 12, 13, 18, and 19).

4. CONCLUSION

It can be concluded that the differences between pre-architects and freshmen are a consequence of the architects' professional training and their continuing familiarity with current values in architecture. Typically, during the years of education, images are gained as vicarious experience through books, journals, lectures, and course work. Overall, the results of multiple sorting procedures support the hypothesis that the period of training in a school of architecture systematically instills an evaluative system characteristic of the profession. The students have comparable views of the buildings

dependent on the length of time spent in education. As Wilson mentions, *architects are taught what to like* [12].

The results outlined above provide empirical evidence for the existence of meaningfully different aesthetic attitudes between the pre-architects and the freshmen. As shown in the results, the representation of buildings is completely multidimensional since it comprised not only schematic information about the form and appearance of these buildings, but also ideas and feelings about the architecture. In this respect, relating the plots to the preceding verbal analysis of the sorting data suggests one obvious interpretation of this discrepancy that while freshmen were constructing their knowledge structures according to objective qualities of the architectural projects, pre-architects were more evaluative, reliant on concepts, connotative values.

Each group discussed in this work displayed homogeneity in judgment as each group had identical aesthetic judgments that could be grouped independently. This finding does not support other related studies [7, 1], suggesting that there is a greater similarity of aesthetic evaluation among professional designers than among the lay public, with 'value convergence' increasing over the course of professional education. However, there were variations existing within each group as the freshmen close to the pre-architects were different in their evaluations. By showing the possibility of having students who are more interested than their classmates,

this research has pointed out the studies treating the first year students as unknowledgeable laypersons: some students might in fact somewhat knowledgeable about architecture. Although it is not the main subject discussed in the paper, the studio teachers may take into account the importance of personal differences among freshmen.

The problem regarding architecture education arises from the system of admission to university in Turkey. The candidates who wish to become architects should pass the annual state-level exam organised by the Higher Education Centre. This exam does not aim to test the design ability of each candidate, which results in a number of students who obtain approval incidentally. Due to their interests in architecture while studying at high school, familiarity with current values in architecture, or having an architect relative or a close friend, some students, however, might be well aware of the difficulty of the task and consider the issue differently from their classmates. In any case, regardless of their initial interest in architecture in the beginning, the metamorphic transformation of a layperson into an architect is an interesting process. By studying the process of becoming an architect, the students with an initial interest in architecture can easily receive the information offered to them, and in this manner they find themselves in a different position, compared to the lay image of a freshman. It is almost like starting a race in advance. Overall, it is believed that the current study emphasized the importance of using an appropriate methodological framework for analyzing both commonalities and differences between the perceptions of different groups concerning their architectural education.

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REFERENCES

- [1] Hubbard, P., "Conflicting interpretations of architecture: an empirical investigation", *Journal of Environmental Psychology*, 16: 75-92 (1996).
- [2] Akalin, A., Yildirim, K., Wilson, C., Kilicoglu, O., "Architecture and engineering students' evaluations of house façades: preference, complexity and impressiveness", *Journal of Environmental Psychology*, 29: 124-132 (2009).
- [3] Akalin, A., Yildirim, K., Wilson, C., Saylan, A., "Users' evaluations of house façades: preference, complexity and impressiveness", *Open House International*, (article in press) (2010).
- [4] Jeffrey, D., Reynolds, G., "Planners, architects, the public, and aesthetics factor analysis of preference for infill developments", *Journal of Architectural and Planning Research*, 16: 271-288 (1999).
- [5] Purcell, A.T., Nasar, J.L., "Experiencing other people's houses: a model of similarities and differences in environmental experience", *Journal of Environmental Psychology*, 12: 199-211 (1992).
- [6] Stamps, A.E., "Comparing preferences of neighbours and neighbourhood design review board", *Environment and Behavior*, 23: 618-629 (1991).
- [7] Downing, F., "Image banks: dialogues between the past and future", *Environment and Behavior*, 24: 441-470 (1992).
- [8] Gifford, R., Hine, D.W., Muller-Clemm, W., Reynolds, D.J., Shaw, K.T., "Decoding modern architecture: a lens model approach for understanding the aesthetic differences of architects and laypersons", *Environment and Behavior*, 32: 163-187 (2000).
- [9] Hershberger, R.C., "A study of meaning in architecture", In Sanoff, H., Cohn, S. editors, *Proceedings of the Environmental Design Research Association*, Raleigh, NC: North Carolina State University, 86-100 (1969).
- [10] Devlin, K., "An examination of architectural interpretation: architects versus non-architects", *Journal of Architectural and Planning Research*, 7: 235-243 (1990).
- [11] Groat, L., "Meaning in post-modern architecture: an examination using the multiple sorting task", *Journal of Environmental Psychology*, 2: 3-22 (1982).
- [12] Wilson, M.A., "The socialization of architectural preference", *Journal of Environmental Psychology*, 16: 33-44 (1996).
- [13] Wilson, M.A., Canter, D., "The development of central concepts during professional education: an example of a multivariate model of the concept of architectural style", *Applied Psychology: An International Review*, 39 (4): 431-455 (1990).
- [14] Baskaya, (Akalin) A., Wilson, C., Ozcan, Y.Z., Karadeniz, D., "A study in re-establishing the corporate identity of a Post Office institution with gender-related differences in perception of space", *Journal of Architectural and Planning Research*, 23 (1): 43-59 (2006).
- [15] Kahvecioglu, H., "Spatial image in architecture: a model on its formation and structure", *Unpublished PhD thesis, İstanbul Technical University*, İstanbul, Turkey, viii-xiii (1998).
- [16] Nasar, J.L., "Urban design aesthetics: the evaluative qualities of building exterior", *Environment and Behavior*, 26 (3): 377-401 (1994).
- [17] Yildirim, K., Hidayetoğlu, M.L., "Effects of the locations of curved areas in the main living rooms of apartment housing on user perceptions", *G.U. Journal of Science*, 21(2): 51-63 (2008).
- [18] Groat, L., "Carbuncles, columns, and pyramids: lay and expert evaluations of contextual design strategies", In Scheer, B.C., Presiser, W.F.E. Editors, *Design Review: Challenging Urban Aesthetic Control*. New York: Chapman and Hall., 156-164 (1994).
- [19] Canter, D.V., Brown, J., Groat, L., "Multiple sorting procedures for studying conceptual systems", In Canter, D.V., Brenner, M., Brown, J. editors, *The Research Interview—Uses and Approaches*. London: Routledge, 79-144 (1985).