ISSN: 2008-5079 / EISSN: 2538-2365
DOI: 10.22034/AAUD.2020.200021.1979

Analytical Model of Meaning-based Housing Design Education Using a Semiotic Approach*

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Received 01 September 2019; Revised 17 July 2020; Accepted 31 October 2020; Available Online 21 June 2021

ABSTRACT

With architecture losing its identity in housing, failure to consider meaning-based design education is regarded as the main cause. Using meaning-generating factors is thought to be an effective way to retrieve identity and instill a sense of belonging to the place, while using signs as the most important meaning factors is one of the best strategies to give meaning to the housing space. The research literature mainly concerns the concepts of meaning, semiotics and problems facing architectural education as well as identity loss of housing, with "practical meaning attitude", "failure to consider content-based criticism in architectural design education", "attitude to meaning in terms of its effects on the user", and "inattention to the role of research in the design education process", being considered as research gaps. The goal of "making housing design education meaningful with emphasis on user-centered semiotic knowledge" is met via answering the questions that focus on components affecting meaning-based design education and the way they are related. The research used a survey and correlation methods along with an inventory. Professors and students of Tehran universities were selected as the samples. According to the research results, understanding the user community through research-based analysis and comprehending aesthetic and psychological dimensions from the users' point of view were found to be the most important factors affecting user views as well as the introduction of meaning in the sign-based housing design process. The proposed model found the effect of aesthetic aspects on the meaning-based design education process to be greater than psychological dimensions. The cyclical process of identifying the context and use of signs for design as well as the evaluation of signs by the user were regarded as the most important aspects of communication among the factors affecting the meaning-based housing design education. To help user understand the housing design, design education should benefit from model cycles, using research-based analysis and evaluating all ideation stages; this helps design and create spatial relations.

Keywords: Semiotics, Design, Education, Architecture.

* This article is an excerpt from the first author's the doctoral dissertation entitled "The process of meaning-based housing design education using a semiotic approach" with the guidance of the second author and the advice of the third author at the Faculty of Architecture and Urban Planning, Shahid Rajaee teacher training University, 2020.

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1. INTRODUCTION

Today, housing architecture in Iran is affected by cultural and identity changes, undergoing many developments in this regard. The issue of culture and identity in a society has always affected the housing architecture of that society, and since house is the first space man routinely interacts with, it affects and is affected by it; therefore, it is necessary to address cultural aspects when designing the architecture of residential spaces (Pourdeihimi & Nourtaghani, 2013, p. 5). On the other hand, the root-cause of many architectural problems in the society, especially in the area of housing, can be sought in education failure to attend to meaning-based aspects (Raeesi & Noghrekar, 2016, p. 14). This is because today's urban architecture is mainly the product of academic education which merely concerns theoretical issues, thus failing to apply practical design education. Housing loss of identity is today thought of an important and pervading part of contemporary architectural spaces, reflecting the inattention to meaning in the field of design education. This is because academic education pays little or no attention to the relationship between architecture and the user, and ignores their views and demands, which hurts architecture in this field (Feizi & Dezhpasand, 2019, p. 164). The present study aimed to remove the problem through proposing suggestions via explaining the effective components in meaning-based housing design education with a semiotic approach, thus modeling the inter-relatedness of the factors in the educational process. The research goals were aimed at making housing design education meaningful at academic levels by applying semiotics knowledge and benefiting user views. To meet the research objectives, it is necessary to answer the questions on the components affecting the meaningful housing education using a semiotic approach and how modeling factors are related.

To explain the research literature, researches on architecture and design education, semiotics, and meaning-based housing designs were studied; accordingly, the most important subjects researchers concerned with were: recommending the use of theoretical approaches in architectural design education; evaluating architectural educational curricula in the most important universities of Iran; laying emphasis on critique when evaluating insignificant parts of the design process, such as critique of forms; introducing the notion of "architect idea" as the most important origin of meaning; explaining functions, forms and concepts as three-fold dimensions and also emphasizing the need to pay attention to identity in designing and constructing today's houses. Recent research in the field of semiotic knowledge and using it in architecture focus on the definition of signs and their dimensions in architecture. Thus, the research gaps in this field include failure to look for meaning in practical courses of housing design education and also failure to attend to user's critiques. In this connection, addressing research gaps is a step towards making housing design education meaningful in the area of practical urban architecture as it creates a better communication between users and today's spaces. Pu it differently, modifying students' attitudes toward meaning and attention to meaningfulness in housing design education can be a step forward to restoring identity in residential architecture (Ghaffari & Falamaki, 2017, p. 340). This research is innovative in that it practically views meaning in housing design education using user-centered critiques.

The research used a survey and correlational analysis to explore the meanings affecting the meaning-based housing design education as well as modeling the factors to extract how the factors affect each other in the education process. Items of the inventory via the survey method concerned housing design and related educational issues. A survey method begins without hypothesis and seeks one (Jabalameli, Mozafar, Ghasemi, & Karimi, 2019, p. 83). The correlation research method follows the hypothesis obtained from the survey method. The first hypothesis evaluates such factors as "aesthetic dimensions" and "psychological dimensions" from the user's point of view as the most important components affecting the meaning-based housing design education. The second hypothesis also evaluates the key factor of the "user-centered understanding of signs" in the relationship between the factors affecting the meaning-based housing design education. Explaining the research theoretical background, research methods are explained in detail, and finally, the results will be presented in the form of factors affecting meaning-based housing design education as well as the relationships between them.

2. THEORETICAL BASICS

Meaning is an outcome of various factors that result from the human and place interaction. Meanings and their components create an internal perception of space, thus becoming an effective factor in creating identity, beauty and enjoyment of the architectural work. To truly understand an architectural structure which is its meaning, one must understand the basic concept of its creator (Bagheri & Einifar, 2017, p. 5). Understanding the signification relationship between "concept" as signifier and "architecture" as signified depends on the knowledge of semiotics. Thus, semantics in architecture is closely related with semiotics (Roshan & Shibani, 2015, p. 152). Applying the principles of semiotics is one of the best ways to investigate how space is given meaning (Sahhaf, 2016, p. 53); this is because signs as the most significant semantic factors to create subjective associations rely on the concept of signification to be an effective factor to promoting a sense of place in relation to the users (Bagheri & Einifar, 2017, p. 6). Therefore, utilizing semiotics in terms of the designer's relationship with the user in

design education can be a step towards giving meaning to space and creating a sense of place.

By semiotics, it is meant the knowledge that investigates the social function of signs and finds meaning-generating mechanisms through sign systems (Bagheri & Einifar, 2017, p. 9). This knowledge pertains to three main areas: "abstract study of signs", "relations between signs" and "user perception". Since architecture as a network of signs, similar to any means of communication, conveys in a social conversation context a set of messages, transferred to the users through signification channels and inter-contextual relationships, it is imperative to pay attention to the user perception dimension when designing aesthetic aspects from their views (Ghaffari & Falamaki, 2017, p. 339). On the other hand, architecture has a vague and unknown concept, i.e., that of design (Mohammadi & Tafazzoli, 2018, p. 6). Design is an artistic phenomenon that occurs in mind and is multidimensional; thus, it is necessary to understand its processes (Amini, Falamaki, & Keramati, 2019, p. 61). Architecture education is signified with design education (Mirjani & Nadimi, 2019, p. 6). Academic architecture education initially tended to individuality (Momtahen, 2018, p. 55). However, architecture education is not naturally proportionate to teacher-centered education at the university, which derives from the objectivist education design. For this reason, following the conventional academic education methods cannot be useful for educating architectural design. Therefore, studies that are directed at the development of architectural design education methods, the mechanisms of constructive educational design approaches can be used (Panahi, Hashempour, & Islami, 2014, p. 27); this is because constructive educational design involves providing the environment, resources, and support for learning processes. Also, considering such principles as active learner participation in learning processes, it is critical to include real contexts for solving problems, learning and participation in social interactions (Qayyoomi Bidhendi & Sepehri, 2016, p. 28). Thus, applying semantic user-oriented design education based on semiotics is also compatible with the nature of the constructive educational environment taking into account such components as content and styles of housing design education. Research on design education requires activities in specific areas of applications, because subject-based education processes involve different methods and steps. In the meantime, addressing a residential space takes priority; because residential spaces occupy about half of the city level, crystallizing culture, tradition, way of life, technology and civilization of any society.

On the other hand, people spend much of their time at home. Therefore, improving the quality of housing greatly contributes to peoples' needs and feeling of satisfaction in their lives. This is while, in recent years, peoples' roles in meeting these needs, including self-identification in residential spaces has not been considered; as humans basically find their identity at home (Etemadipour, Mahdinejad, & Saleh Sedghpour, 2020, p. 44). The structural housing similarity in different parts of the country with different human characteristics is what constitutes the problem at hand, the causes of which can be investigated in different respects. Causes of this problem in a government scale of housing include a quantity-based perspective and the urgent need to build houses in recent years due to the rapid growth of cities, war and reconstruction, population growth and inattention to post-settlement assessments. Speaking of private sector housing, causes such as similar urban planning regulation and centralized design and architecture education can be named. Researches have, failing to respond to today's needs, have focused their attention on traditional housing and meeting a housing model in line with the collective identity called Iranian-Islamic identity, while ignoring the needs of humans living in different regions of the country with different ethnicities and races. Thus, it is clearly seen that no attention is paid to housing design in architecture education as this study seeks to introduce meaning together with a semiotic approach to the housing design education (Mahmoodi Mehmandust, 2018, p. 98).

3. RESEARCH METHOD

In this research, the methodology has two phases. In the first phase, the "cross-sectional survey" was used for exploration by the user community, while in the second phase, the correlation method was used. Survey research method begins without a hypothesis. In this article, the views of a group of architecture students and their professors on the research topic were gathered in the form of an inventory, and accordingly, effective concepts and variables were identified followed by a factor analysis. The inventory items were all based on housing design and architectural education of residential use. In the second phase, the research begins with the hypothesis from the survey research method. In this stage, hypotheses and theoretical foundations were used to model the relationships between variables (Groat & Wang, 2002). It should be noted that the inventory was constructed by the researcher and was based on third-round Delphi method.

4. MATERIALS AND PROCEDURES

This section deals with the statistical population, method and sample size of the research. Finally, the research instrument is explained.

4.1. Statistical and Sample Population

"Users and experts" in architectural design education comprised the statistical population. Professors and senior students at the B.A. level in architecture from Tehran and Azad Universities constituted the statistical population. The sample size was 200 users; speaking of sample sizes, Klein proposes 3 sample sizes (i.e., 20-

40) for each variable or 2.5 to 5 people for each item in the inventory (Kline, 2010). Thus, this method helps achieve 5 times the number of items (5*34) equivalent to 170 people as enough for the sample size; however, 200 people were selected as the sample size to ensure the results. The sampling method in survey and correlation research methods was "random clustering". Because an inclusive list of individuals in the study population was not available, this method deemed appropriate (Ghaljaie, Naderifar, & Goli, 2017, p. 2).

4.2. Research Tools

Survey inventories often deal with research on socio-cultural interactions or perceptual concepts of the architectural environment (Mir Moghtadaee, Ganjizadeh, & Hosseinabadi, 2018, p. 9). In the first phase, answers to the inventory should be considered. The inventory was, in the first phase, arranged on a 4-degree Likert scale: "strongly disagree", "disagree", "agree" and "strongly agree" (Sahragard Monfared, 2015).

In the second phase, the results of the four-choice answer inventory were used together with correlation research methods to explain the relationship between the variables in the survey method. It should be noted that achieving goals and contents of Table 1 is made possible through three-round Delphi research method in collaboration with professors specializing in housing design education from the Tehran University. Accordingly, the unstructured interviews with experts were coded in open and axial categories, helping create the goal-content table. The first inventory was arranged using the relations between the objectives with the content. The inventory was distributed among the same professors, and the concepts were extracted using the Q factor analysis. The third-round Delphi method was performed by eliminating questions unrelated to the results of the second round, in order to control the reliability and iteration of the results, with similar concepts of the second and third rounds of Delphi presented in form of four factors in the goal-content Table 1. Goals in the table constitute the axial coding using the Delphi method.

Table 1: Goal-Content

Goal \ Content	Factor 1: Factors Underlying a Sense of Attachment to Place in Meaning-Based and Reading-Oriented Housing Design	Factor 2: Methods of Using Semiotics in Reading-Oriented Education of Housing Design	Factor 3: Strategies for Creating Semantic and Semiotic Aesthetics in the Content Approaches of Reading-and Perception-Oriented Education	Factor 4: The Effect of Semiotics in Housing Design Education
Semantic dimensions program			*	
Human interaction with the environment		*		
Direct connection of cultural, social and identity phenomena with design education			*	
Responsiveness	*			
Education in a participatory environment and social interactions	*			
Attitudes towards architecture in humanities		*		
Attitudes towards semiotics in psychology	*			
Attention to the multi-layer nature of architecture and semiotics in design		*		
Education of aesthetic at semantic and semiotic levels				*
Reading-based design education				*
Improving sense of attachment to housing				*
Integrating objectivist, subjectivist and constructivist approaches in education			*	

The relationship between four-fold goals and content in Table 1 is indicated by a star and at least one item is designed for each star. Considering that the inventory taken from Table 1 is used to evaluate the views of users (housing project students), examples rather than concepts are used in designing the items; this is because students' perception of items as pertaining to the examples is greater than of concepts, with concepts and factors being higher than the answers. The results from answering the inventories were extracted in the form of R factor analysis as summarized in Table 2.

5. Findings

Following the matrix table of rotated data, the variables constituting each factor were determined. Any variable consisting of at least 3 items with a factor load greater than ±0.3% was considered significant. Accordingly, Table 2 summarizes the concepts extracted and the items giving meaning to the factors (Saleh Sedgh pour, Hasan nia, & Damavandi, 2014, p. 35).

Table 2: Meanings and Factors Extracted from Factor Analysis of the Inventory Results

Factor	Constituting Questions	Main Meanings	Corrected Meanings
1	2-8-12-34	Innovation in materializing the idea of housing design according to the context of social culture	Ideation
2	3-5-13-25	Designing housing spatial relationships using extracting users' views on their cultural and social interactions and responding to them through visual and non-visual senses	Spatial Relations Design
3- 4	27-28-29-30 1-4-14-22; Inverse	Directing the process of housing design education via users' sensory and emotional reading using environmental signs to designing and evaluating the mental reading of users and students in critique of the way signs are employed to achieve design goals	Collective Reading-Oriented Evaluation o the Signs
5	6-17-20	Designing the form and structure of housing using contextual signs that are time-dependent	Designing Forms and Structures
6	9-15-16	Expressing aesthetic dimensions in the form of innovative idea of housing design	Aesthetics Dimensions
7	7-32-24; Inverse	Research and analysis to identify environmental and contextual factors	Research-Oriented Analysis
8	10-11-31	Creating the concepts of privacy and interaction in a residential complex through psychological dimensions	Psychological Dimensions

5.1. Describing the Model

In this section, the factor analysis results underwent a path analysis. Path analysis aims to analyze and present results that requires a model to be regulated in the form of a causal diagram. This model was developed drawing upon an acceptably theoretical reasoning (Groat & Wang, 2002). In this step and in order to provide modelling based on the path analysis method, the factors derived from the factor analysis of the inventory were used. Path analysis helps identify the extent to which variables affect each other and reports how variables are inter-related in the real world (Sarmad, Bazargan, & Hejazi, 2016). At this stage, to develop a theoretical model, the relationships between the seven factors were examined in pairs as shown in Table 3.

Table 3: Direct and Indirect Relationships and overall Standard Effects of Factors and Concepts Extracted

Relationship of Two Variables	Direct Standard Relationship		Indirect Standard Relationship		Overall Standard Effects		Standard Error
F7 → F6	*	0.175	-	-0.002	*	0.173	0.074
F7 → F1	*	0.165	-	0.028	-	0.183	0.111
F1 → F3	**	0.235	-	0.033	**	0.272	0.064
F6 → F1	-	0.118	-	-0.007	-	0.113	0.104
F6 → F5	*	-0.531	*	0.549	-	-0.038	0.237
F5 → F2	-	-2.765	-	2.877	-	-0.405	1.647
F2 → F5	**	2.099	**	-1.469	-	0.309	0.542
F1 → F2	*	1.082	*	-0.853	-	0.150	0.430
F7 → F5	*	-0.507	*	0.546	-	-0.026	0.239
F6 → F3	*	0.157	-	0.064	*	0.0206	0.092
F2 → F3	-	0.115	-	-0.074	-	0.038	0.070
F5 → F3	-	0.068	-	-0.122	-	-0.036	0.083
F3 → F7	-	-0.122	-	0.001	*	-0.121	0.062
F8 → F1	*	0.138	-	-0.001	-	0.137	0.121

If p is greater than 0.05, the relationship is not significant (-), if it is less than 0.05, the relationship is significant at 95% level (*) and if it is less than 0.01, it indicates 99% confidence level (**) (Seif Naraghi & Naderi, 2004)

Accordingly, the factor "research-based analysis" had a direct and significant effect with "aesthetic dimensions" at a confidence level of 95%. The factor "ideation" was significantly related with the factor "collective reading-based evaluation of signs" and could be explained at a 99% confidence level. The factor "aesthetic dimensions" was found to have a direct effect on the factor "collective reading-based evaluation of signs" at a 95% confidence level. "Collective reading-based evaluation of signs" had a direct and indirect insignificant relation with the factor "research-oriented analysis". However, its overall standard effects were significant at the 95% level. The factor "psychological dimensions" had a significant and direct relationship with "ideation" at 95% confidence. The "research-based analysis" had a direct and significant relation with "ideation" at the 95% level.

The "aesthetic dimensions" had a direct and indirect insignificant relation with "ideation". However, considering the theoretical basics and the extent to which ideation was affected by aesthetic-aesthetic dimensions in the real world of ideal design, this relationship was maintained in the model. The factor "aesthetic dimensions" had a direct and significant relation with "form and structure design" at the 95% level. The factor "form and structure design" was directly and indirectly related with "spatial relationship design", with the relationship being insignificant. This is while its inverse relationship, i.e., the direct relationship between the effect of "spatial relationship design" on "form and structure design" was significant at the level of 99% confidence. However, considering that the nature of design depends on inter-relatedness between form and structure design and spatial relationships, the reciprocity between the two factors were retained in the model. "Ideation" was found to have a direct effect on "spatial relations" and was significant at 95% confidence level. The factor "research-based analysis" had a direct and significant relation with "form and structure design" at the level of 95% confidence. The factor "spatial relationship design" had a direct and indirect insignificant relationship with "collective reading-based evaluation of signs". The factor "form and structure design" had a direct and indirect insignificant relationship with "collective reading-oriented evaluation of signs". However, concerning theoretical basics of education, which evaluates the users' views based on the embodiment of ideas through form and space design, these two relations were retained in the model.

The insignificant relationships maintained on AMOS software was conducted in accordance with theoretical foundations proposed in the book "Structural equation modeling in social research using Amos Graphics". In this book, the author explains that the criteria for accepting and rejecting insignificant relationships on software as being theoretical criteria (Ghasemi, 2014) (Fig. 1).

5.2. Reliability of the Inventory

Cronbach's alpha is evaluated as a measure of reliability to examine the usefulness of the inventory. Commonly, when the alpha is greater than 0.7 the reliability of the inventory is acceptable (Delavar, 2018). The internal consistency of the total items in the inventory was estimated to be 0.801, indicating the research tool enjoyed the necessary reliability.

5.3. Validity of the Inventory

In this article, content and structural validity were used.

5.3.1. Content Validity

The validity of the questionnaire refers to the goal the test was designed to meet (Seif Naraghi & Naderi, 2004). Speaking of content validity of the questionnaire, the goal-content table was used to design the items, as shown in Table 1. Other content validity in this research was performed by five professors who confirmed the research results.

5.3.2. Structural Validity

In the R factor analysis, responses are categorized. Each factor includes a set of items and indicates a shared view on the subject. To carry out the factor analysis, the sample size adequacy test must first be performed. For this, the KMO test and the Bartlett's test of sphericity are conducted. The KMO test result should be greater than 0.6, which was estimated to be 0.65; thus, the sample size was found to be adequate. In Bartlett's test of sphericity, if its significance is less than 0.05, factor analysis is appropriate, with the significance of Bartlett's test of sphericity was also evaluated to be 0.00 (Sahragard monfared, 2015) (Table 4).

Table 4: KMO and Bartlett's Test of Sphericity for Sample Size Adequacy

Kaiser-Meyer-Olkin (KMO) for Sample Adequacy	0.653
Bartlett's Test of Sphericity, Approximate Chi-square	1459.956
df	561
Sig.	0.000

5.4. Model Acceptability

Following modeling, the AMOS software was used to determine and measure the acceptability and fit of the model. P, as one of the acceptability indicators of the model is 0.177 and because it was greater than 0.05, the model was found to be acceptable. CMIN/DF also is 1.459, and since this number should be less than 1.5

or 2, the model is confirmed to be acceptable; (Delavar, 2018). Thus, in general, the proposed model was found to be acceptable and matched the reality on the society (Table 5).

Table 5: Model Acceptability Indicators

Indicators	CMIN	DF	P	CMIN/DF
	Chi-square	Freedom Degree	Sig.	Freedom Degree/ Chi-square
Model	10.215	7	0.177	1.459

6. DISCUSSION

Two hypotheses were stated when answering the research questions. The first hypothesis aimed to elaborate on such factors as "aesthetic dimensions" and "psychological dimensions" from the view of the users as the most important components affecting meaning-oriented design education process, which was confirmed according to Table 3. The second hypothesis of the research focused on the user-based relationships between the components and also the cyclical effects of such factors as "research-oriented analysis" and "collective reading-oriented evaluation of signs" on each other. As shown by Table 3, the effect of research-based analysis factor on such factors as aesthetic dimensions and ideation, as well as their effect on collective reading-oriented evaluation of signs in housing design was found to be significant. Since aesthetic dimensions differ from the point of view of individuals under different conditions, identifying the conditions affecting users' perspective had a direct effect on achieving their aesthetic dimensions (Pakzad & Saki, 2014, p. 9). The relationship between "aesthetic dimensions" and "form and structure design" was direct and significant. The relationship between "form and structure design" and "spatial relationship design" was insignificant. This is while it was inversely significant. However, considering that the nature of design depends on the inter-relatedness between form and structure design and spatial relationships, the reciprocity between the two factors were maintained in the model. According to Table 5, the relationship between "spatial relationship design" and "form and structure design" and their effects on "collective reading-oriented evaluation of signs" was considered insignificant due to the behavioral levels of some items; however, considering the obvious effect of the idea output in the form of space and form design, these relations were maintained in the model. This process has to be repeated if users do not consider he evaluation to be satisfactory, generally yielding significant effects. The relationship between "collective reading-based evaluation of symptoms" and "research-based analysis" was found to be insignificant. Considering the theoretical issues of the research and the fact that changing aesthetic issues will lead to differences in ideation, this part of the relationship was maintained in the model. Because the design process criteria involve paying attention to the reading-oriented analysis, with users' satisfaction depending on the designers' knowledge of the context, the relation was maintained in the model.

7. CONCLUSION

Considering the theoretical basics of the research, one of the fields in semiotics is the user-centered approach; hence, the effect of "semiotics" on "meaning-focused design education process", as according to the proposed model, can be explained in form of a "research-oriented analysis" for determining the aesthetic aspects and identifying the social culture context. This is because designers analyze the data through the process of contextual research and explore aesthetic aspects from the perspective of the users; thereby extracting ideas accordingly. Ideation draws upon psychological dimensions along with aesthetic aspects, thus creating a work of art using form, structure and space in design. Evaluation does not refer to what is implemented at the design education, rather it means an evaluation of the user community based on their perception of the signs that reveal their aesthetic views in the form of design. Examining satisfaction from this process, cycles are formed by affecting the way research-based re-analysis is evaluated. Therefore, identifying the context and the users through research and analysis of the information and achieving aesthetic dimensions from the perspective of the users are the most important factors affecting the ideation.

Identification of the context and application of signs for aesthetic and psychological satisfaction in the form of design and also the evaluation of signs by the users constitute the most important aspects of communication between the factors affecting the meaning of housing design education. As inferred from Figure 1, the effect of aesthetic aspects on the design education process is greater than the psychological dimensions. According to the results, psychological aspects mainly affect ideation in form of design and education process, but aesthetic dimensions, while affecting ideation, directly affect the design of form and structure and indirectly affect the spatial relations design. According to the results, the ideation factor directly affects users' reading of the design and signs, thus revealing the need for the evaluation of ideas in the education process. According to the model, one of the necessary conditions for user satisfaction using reading signs in design education is to underscore the processes of partial cycles between the design stages; this is because the whole analytical model of the education process is codified as a general cycle, which

itself involves several more detailed cycles. The cycle of research-centered analysis, ideation and collective reader-oriented evaluation of signs is one of the sub-cycles that underlies the importance of the ideation factor and its effect on user reading. The cycle of research-oriented analysis steps- aesthetic dimensions-form and structure design- collective reader-oriented evaluation of signs, as another sub-cycle also signifies aesthetic-cognitive dimensions from the view of users. Another partial cycle in the education process is constituted between the stages of form and structure design and spatial relationship design, which prompts professors to pay attention to the way structure and space are matched in student design. The cycle of research-based analysis - ideation - design of spatial relationships - collective reader-oriented evaluation of signs also revealed the need to guide students to realize ideas in form of spatial relationship design for user satisfaction.

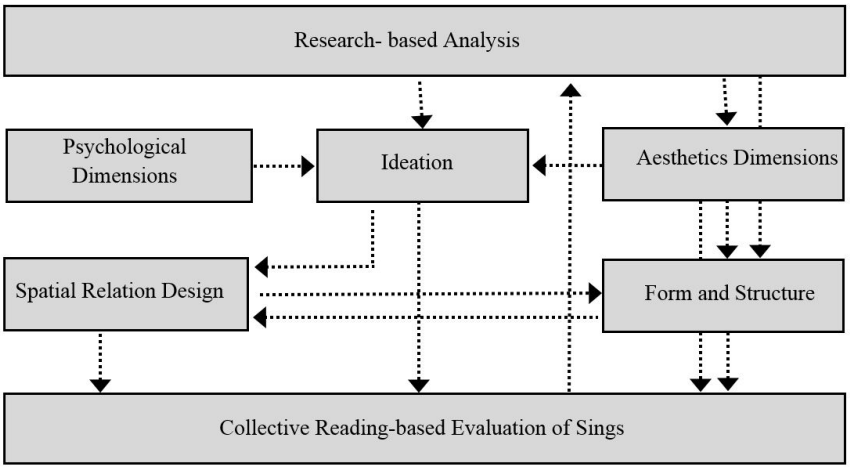

Fig. 1. Design Education Process Model Using Semiotic Approach

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HOW TO CITE THIS ARTICLE

Etemadipour, M., Mahdinejad, J., & Saleh Sedghpour, B. (2021). Analytical Model of Meaning-based Housing Design Education Using a Semiotic Approach. *Armanshahr Architecture & Urban Development Journal*. 14(34), 1-10.

DOI: 10.22034/AAUD.2020.200021.1979
URL: http://www.armanshahrjournal.com/article_131871.html

Appendix:

Examples of Inventory Items that Were Developed with Emphasis on Housing Design Education As Follows:

- Research-oriented analysis on user psychology underlies users' satisfaction with the result of housing design?

  Strongly Disagree □ Disagree □ Agree □ Strongly Agree □

- In housing design education, aesthetics expression can be defined in form of providing peace and comfort in spatial relationships?

  Strongly Disagree □ Disagree □ Agree □ Strongly Agree □

- Designing form or space using the idea of privacy in residential complexes underlies user satisfaction with the design?

  Strongly Disagree □ Disagree □ Agree □ Strongly Agree □

- In housing design, meanings tend to be expressed in physical distinctions such as scale, shape, material, etc., rather than in spatial distinctions?

  Strongly Disagree □ Disagree □ Agree □ Strongly Agree □