

Semiotic Explanation of Codes in Architectural Representation Methods*

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ABSTRACT

In semiotics, the concept of representation is defined as a way of evaluating the meaning hidden in the texts. Today, the use of architectural representation, as a central concept in the creation of reality, is as common as the use of maps and sketches. What is clear is that architectural representation has found its methods in ordering and giving the meaning to the signs; so to find their meanings in architectural texts, one must use those concepts that make the understanding of representation easier. The concept of codes transforms signs into a meaningful system by structuring them, and that is why it is represented along with the concept of representation in the present study. The architectural representations also need to be combined, constipated and expanded using a qualitative research method and their semantic system must be decoded. To this end, the semantic explanation of different types of architectural representations based on the relationship between their codes is considered as the main issue of this paper. In this regard, to understand the fundamental differences between different types of architectural representations, three general schemes are assumed for them, then in the analytical section, using an interpretive and structural approach, combinations of architectural representations and coded, based on hypotheses, are presented in tables. In this way, the obtained interpretations can enhance the capacity of architectural representation, especially in the area of implicit architectural meanings. Consequently, it can be stated that semiotics explains architectural representations as a medium of form and meaning production. The three principles of chronological order and contrast, apparent similarity and spatial proximity, as well as the influence of other related texts, are considered as the most important signification for the formation of architectural representations, each of which create new semantic connections among architectural codes.

Keywords: Architectural Representation, Architectural Codes, Semantics.

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1. INTRODUCTION

According to the empirical view of modern and postmodern sciences, not only does the contemporary human being look at the world using images, but also past and future human beings look at the world using the images of the world created for themselves. In fact, the main capital of every age is its last image of the truth of the surrounding world and itself, and it is this image that is origin of all thought, and with a little search one can see that the wisdom of the new age, like the wisdom of each of the earlier ages, has such an image of the world for itself (Burt, 1990, p. 211). Thus images and signs, like air and atmosphere, have always surrounded us and have always been deeply explored. Semiotics, as one of the methods of text analysis, seeks to analyze texts in the form of structured generalities and to search the hidden and implicit meanings of the signs. Semiotic studies focus on the system of rules governing the discourses involved in the texts and emphasize the role of the semiotic context in shaping sense (Chandler, 2008, p. 21). Codes create a framework in which signs find meaning. In fact, something that is not in the realm of codes cannot be called a sign. Codes transform the signs into meaningful systems, thereby creating a relationship between the signifier and the signified (Chandler, 2008, p. 221). Codes, with their mysterious structure in mind, affect the way by which the signs and symptoms found in the media are interpreted as well as the way people live. Signs and relationships are two key concepts in the semiotic analysis method, and even the relationships can be more important than the objects because the creation of sense is done only by the relationships between objects. (Berger, 2006, p. 19). As such, in architecture, it is very difficult to consider signs without a coded structure and it is attempted to use it to achieve the search purpose. In the field of architectural signs and cognition of them, semioticians such as Pierce, Morris, Greimas, and Eco have provided discontinuous explanations and in the present study, it is attempted to exploit the theories of some of them.

The present study aims to emphasize the value of representation as an investigable phenomenon in the design and structure of architecture considering the various aspects of architectural representations. As such, explaining different types of architectural representation methods and how they relate to architectural codes is valuable because architectural representation is the most important semantic process in the understanding and construction of architectural codes. The authors also attempt to classify and interpret the serious differences between these types from a semiotic perspective.

2. PROBLEM STATEMENT

Symbols can appear in the form of words, images, sounds, manners and objects. Contemporary

semioticians do not study the signs individually. They study them as part of the sign systems. They seek to answer the questions of how senses are constructed and how facts are represented. Originally, semiotics is associated with the production of sense and representation in many ways (Chandler, 2008, p. 19). A wide range of spatial or shape ideas have been formed to create codes in architecture and to discover ways of constructing and combining them, indicating the dependency of architectural logic to the constraints of "architectural representation". So, to study a representation, the sense and purpose of that scheme should also be questioned and investigated.

The main problem of this study is to explain the different types of architectural representation in its evolution process. But at the stage of developing this problem, the underlying semantic layers draw authors to the field of architectural codes for closer recognition, and raise the issue of the ambiguity of diversity in representational methods. For this reason, explaining the relationship between architectural codes and representations is the next issue that needs to be explored. If it is accepted that the relationships between architectural codes have led to the formation of multiple representational methods, it is necessary to examine the relationships and meanings of codes while dealing with the way through which different types of architectural representations are formed. So the next issue will be understanding of the relationship between architectural codes and representations.

The novel approach in this paper goes back to the type of view given its semiotic structure and attempts to examine the architectural representation beyond the explicit meaning of architecture and in the knowledge of the signs and codes. This kind of view addresses implications and their effects on the construction of architectural reality and does not know their research value less than their explicit meanings.

3. ARCHITECTURAL REPRESENTATION FROM A SEMIOTIC PERSPECTIVE

While semiotics often deals with analytic forms of text, it can also include philosophical theories about signs and their role in constructing reality, and thus for semioticians, the study of representations and representational processes are of particular importance so that they can always see the construct in representation more realistically. One of the most obvious characteristics of semiotics is that they follow representations in other things and seek to relate them to reality, for example in a design or image, all words are removed. The nature of the real world cannot be imagined merely in linguistic terms and by referring to their descriptions. Representation is a very important aspect of any kind of visual and design-based knowledge. The purpose of representation is to make a relationship between an idea and how its thinking and design processes are represented. This

is multifaceted in architectural representation that has been in the evolutionary path of past times, with a focus on how it is received, and plays an important role in understanding architectural works and experiences by combining architectural ideas (Burr, 1995, p. 11). Today, architects do not build buildings, but also they represent drawings and models of the buildings. These achievements are closely and intimately tied to the work being produced and form an integral combination. The very important point mentioned above means that today there is no escape from architectural representation as an achievement for explaining architecture, and images, like instances with quasi-linguistic function, have been and are always required for architectural implications by architectures so that he can transform what he thinks to something perceivable for others. Architectural representation is a way of presenting the architect's idea to facilitate how to understand and then construct an architectural work, because buildings are no longer built by architects. Representation, by its definition, is the description, expression, or assignment of a role by words, terms,

characters, or symbols capable of presenting a mental image (Simitch & Warke, 2014, p. 27).

All areas affected by the essence of a project design-whether made or not- are of representation. These parts are layers and pieces of the same sources that are made as compounds under the influence of how empirical and physical understanding of the work. Originally, representation is used as a central focus for architects and for creating linguistic dialogue in the design process. Choosing one type of representation from the impact time of the selection significantly affects the outcome and output of the project, compared to other options (De La Puerta, 1997).

As such, it can be assumed that the various buildings constructed in architecture can be represented by a semantic system assigned to them by codes, and that approach the desired reality by arranging or combining signs. For example, the role of the signifier and the signified in the formation of architectural sign is of codes, and it is the relationship between them that gives a sense to the sign (Fig. 1).

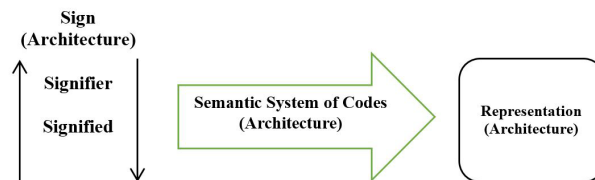


Fig. 1. The Model of Semantic Relationship between Representation and Architectural Sign (Signifier and the Signified) From a Semiotic Perspective
(De Saussure, 2010; Course in General Linguistics)

4. ARCHITECTURAL CODES IN SEMIOTICS

In general, according to Eco's theory, architectural codes can be classified as follows:

A) Technical Codes: Technical codes refer to those codes implying architectural engineering knowledge (beams, columns, roof cover systems, plates and insulation, etc.). They contain the primary elements of architecture. To him, there is no content relationship between these codes. For example, the expression methods used in architectural engineering can be mentioned. Architectural form is broken down into beams, floors, columns, plates, concrete, insulation, wiring and etc. At this level of coding, there is no relational "content" unless a structural or technical function or a technique is of relational nature. There are only structural logics or structural conditions under the support of architecture and architectural implications.

B) Syntactic Codes: These are the codes of the space and refer to the location and the relationship between the components of an architectural work. Social and cultural conventions are involved in the formation of these codes, the architectural elements come together according to a specific logic, and create semantic

implications, such as: the relationship between the staircase and the courtyard. The best examples of these codes are the typological codes that are related to space types such as the circular plan, the cross plan, the open plan, the maze, tower and so on.

C) Semantic Codes: These codes emphasize secondary and implied implications of architecture. It is here that the individual elements of architecture produce a deeper semantic implication in relation to the implied implications. Eco divides the semantic codes into four types: 1. Codes with primary function, such as ceiling, staircase, window; 2. Codes with secondary implied function, such as portal, wind-catcher, and pediment; 3. Those codes that imply the ideological implication of residence, such as: alcove, spring house, reception hall; and 4. Those codes that imply functional and sociological types of building in a broader classification, such as: apartments, traditional house, manor house, school, and hospital (Eco, 2017, p. 253).

Unlike linguistic codes, architectural codes do not provide a system of possible relationships with different messages, and cannot provide unlimited number of different and contradictory forms because of the functionality of the architecture and the standards contained therein.

4.1. How to Choose a Theory in Reading Architectural Representation

According semioticians, structural similarities can have different implications in reading signs. Thus, these similarities and differences together demonstrate the implicitly significance and generalizability of a theory against competing theories. In this section of the present study, due to the plurality in the choice of architectural representation reading methods, how to choose the contextual theory over competing theories is explained.

No two sets, no two kinds of experiences in human life and thought are more fundamental than the principle of continuity and discontinuity (Wilden, 1987, p. 222). While humans experience time continuously, to express it, he acts in both analog (continuous) and digital (discontinuous) ways. Analog signs, such as images, gestures, textures, and flavors, have a graded relationship on a continuum. Analog codes inevitably reveal inner states, hidden intentions, and honesty (Chandler, 2008, p. 80). Analog codes, compared to digital codes, represent more quantitative and physical capabilities. For this reason, in the present study, the choice of hypothesis and reasoning method is based on analogue and continuous forms so that architectural units, due to their continuous structure in representation, are not disjointed and interpreted separately. Semantic coherence in codes is one of the essential principles in semiotics and prevents profound transformations in the thought of codes. The reason behind the selection of semiotic method presented by Eco, as the contextual theory, is also related to his point of view. According Eco, the important distinction between the carriers of signs is the difference between the concept of 'cases

and types'. In semantics, cases are examples of a type (Eco, 1965, p. 146). In this regard, he lists three types of sign carriers, and it is noteworthy that the distinction between them depends on their material forms:

A) Signs that form and repeat a large number of completely identical cases.

B) Signs that are made according to one type, but have a definite quality of material uniqueness in terms of case.

C) Signs that just have a case in their types are identical in type and case (Eco, 1976, p. 178).

As such, it was attempted to include architectural representations in specific types that fall into the second and third types of signs proposed by Eco because according to authors, architectural sign systems semantically have a variety of qualities in terms of type and case, but also have a defined structure in layout. Also, any architectural work can be a unique case. There are, of course, examples of architectural works that are of the first type, but are not considered here because of the lack of fundamental theoretical features of architecture.

5. RESEARCH QUESTION

The first question raised with respect to the types of representations expressed in related historical sources is whether some roles can be categorized according to the code domain in architectural representation or in other words, to how many types various architectural representation methods can be divided into based on their code system? Second, what are the interpretations of the semantic semiotics generated by any type of codes? As such, three types of discourse are considered and explained (Fig.2).

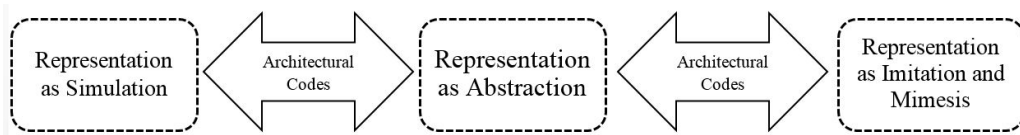


Fig. 2. Analytical Model of the Relationship between Codes and Architectural Representation, According to the Contextual Theory

6. METHOD

The main characteristic of qualitative research is the selection of an inferential approach with the aim of identifying the key issues, founding the precise method of coding, combining the results and finally developing them in a coherent paper. Qualitative research involves the conscious use and collection of empirical data (Lincoln & Denzin, 1994). If the researcher wants to complete his/her obtained data and evidence about the phenomenon by quantitatively measuring qualitative evidence, the use of mixed research methods is needed (Creswell & Plano Clark, 2007).

The data collected in this article are of two types of observational and documentary data, and it was

attempted to mix these documents in a qualitative way. In this paper, two qualitative research approaches including contextual and interpretive theories are examined. According to the contextual theory, first, the first variable, namely, architectural representation and then the architectural codes, are explained in three technical, syntactic, and semantic domains. Moreover, specific and well-documented historical examples are also provided in order to obtain some sort of classification according to the theories of researchers in this field. These classifications are subsequently decoded and interpreted. In this article, the interpretive approach is based on semiotic theories about the semiotics of media and considers architectural representation as a media producing codes. The

semiotic analysis of a medium has three aspects: Paradigmatic –Structure and Syntagmatic Structure, Intertextual Analysis, and Metaphor & Metonymy. All three aspects of this analysis have been used in this study and presented in combination in tables.

The methodology of this research has three stages: 1. Exploratory research: It is carried out by library method to scrutinize the research subject; 2. Observation: its three components including sense exploration, understanding of the relationships between the phenomena and the identification of sensitive points are assessed; and 3. Simultaneous interpretation: The final data analysis is performed and the model of its analysis is developed and designed.

The validity of this research - whether in the hypothesis or in the analysis - has been obtained by collecting data from multiple references and on different scales. The precise guidance method of data collection used to perform analysis is the most important technique in the reliability of this research. Therefore, selection and collection of samples were done concurrently and documenting them was performed based on access to primary references, comprehensibility of the issues, and the accuracy of the processes performed.

7. RESEARCH HYPOTHESIS AND CONCEPTUAL MODEL

The classification of architectural representation methods as the main hypothesis of this study is

formulated as a simplified conceptual model¹. In this section, it is assumed that the first role of all kinds of architectural representations, namely “imitation and mimesis” is the oldest way in which the reality of architecture is presented and it is always true in all representations. The second method, known as “representation as abstraction”, began from the West Renaissance era, during which the architectural representation techniques and tools evolved and the perspective and optical rules were taken into consideration by designers and these changes shifted the semantic focus of architectural representation and created new types. The third method, called “architectural representation as simulation”, has been considered since the beginning of modern thought. This type of representation brought the latest technical tools for architects to discover the architectural codes and was formed as reality based on the authenticity of the image and object.

From the authors’ point of view, this classification contributes to the analysis of a broad concept such as architectural representations, and results in more detailed semantic interpretations (Fig. 3). Here, a general framework is defined for hypotheses, and using an inductive method, it is attempted to present representations in terms of their types of semantic codes by providing related examples. In addition, these hypotheses are implicitly combined with the architectural codes in the technical, syntactic, and semantic domains and prepared to be interpreted.

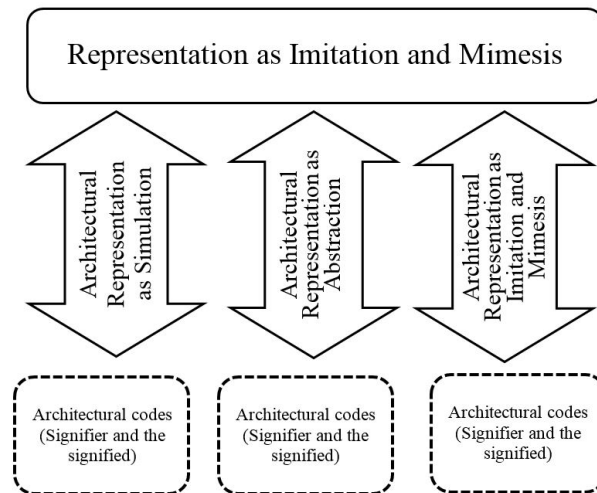


Fig. 3. Primary Conceptual Model of a Variety of Architectural Representation Methods

7.1. Architectural Representation as Imitation and Mimesis

Throughout history, imitating reality and various ways of presenting it as truth have always been a valuable goal for artists and architects. To achieve this, they have used color, texture, penumbra effect, etc. in their models, drawings, and paintings. To represent, there must first be something similar to the main thing, then a clear understanding of it must be obtained. That is

to say, before something can be represented, it must actually exist (Akin & Weinel, 1982). Representation means to be a representative of something or to repeat the presence of something. Because the implications of the “representation” concept are much wider than the implications of the “imitation and mimesis” concept, this term has become a suitable alternative for imitation (Shafiei Kadkani, 1971, p. 28).

According to the hypothesis, in this method, the codes derived from architectural representations are

Shojaee, S.M. et al.

objectively shaped with the emphasis on the concept of imitation and repetition and have distinct domains and known relationships that are generally dependent on the problem of modeling nature. It can be stated that the relationships of this type of codes with architectural representations are formed based on similarity and iconography.

Archer (1971), in his studies, stated that the house shape has remarkably remained unchanged throughout history and its sense has undergone no major structural changes, indicating a marked continuity of symbolic spaces, even despite differences in beliefs and related issues. Also, he emphasized the imitation of early human representations. In the earliest times of human habitation, one of the most important architectural representation methods can be found in imitating nature (Archer, 1971).

For example, Hodder (1984) named three main concepts in the architecture from European Neolithic era up to now:

A) Domus: a place for nutrition, symbolic details, and

the focus of power relations at home

B) Agrios: Outside the house and non-domesticated area

C) Foris: The door that connects the inside with the outside (Fig. 4).

Domus was a prominent concept against wild and dangerous outside, and plants and animals had to be tamed and controlled when reached the domain of Domus. Domus had become a metaphor for a domesticated society. In houses located in central Europe in the fifth millennium BC, a new change in the subject of Domus was made for Hodder, the large sizes, the deep entrances, the linear classification of the spaces and bordering houses with fences were also related to parts of the Foris, and instead of changing the interior, it is fences and entrances that are emphasized (Hodder, 1984). He interpreted these developments as an indicative of the expansion and creation of relationships, dependencies, and imitations of neighbors and foreign groups (Figs 4 & 5).

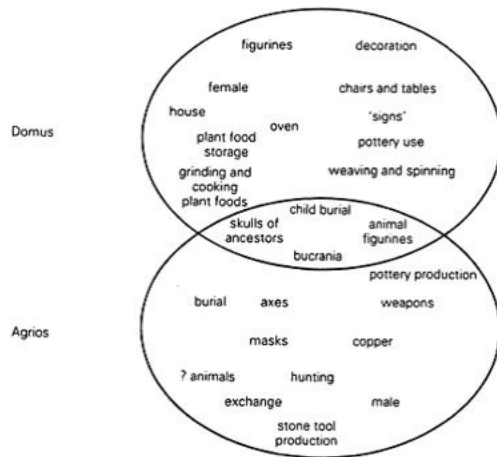


Fig. 4. The Link between Domus and Agrios in Eastern European Architecture, Fifth Millennium BC

(Hodder, 1984; Jarzombek, 2013)

7.2. Architectural Representation as Abstraction²

Broadbent (1980), against the roots of the theory on the religiousness and ritualism of architecture, stated: It seems that for the first time what encourages human beings to build has been usefulness. Trying to prove that the first buildings are symbolic in itself is a futile thought, but one cannot ignore the symbolic importance of the building as an important principle that has given rise to abstract thinking (Broadbent, 2009).

In this type of code, the concept of abstraction is manifested in the form of abstract concepts derived from classical geometry and mathematics in Renaissance architecture, and by the end of the 19th century, it has been one of the most important symbolic

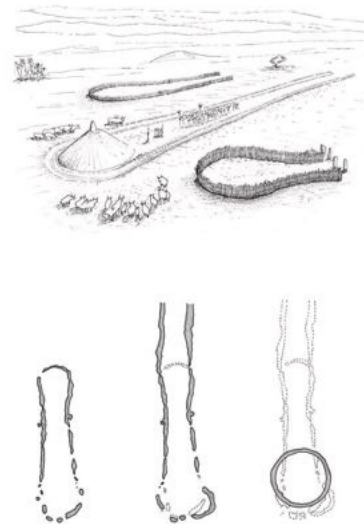


Fig. 5. A View of Cerny Region in French, Fifth Millennium BC

structures in architectural representation. Because of their abstractness and being formed in human mentality, these concepts created a new kind of architectural code in their representations that were conceptually and structurally different from the conventional imitation method.

In the post-Renaissance era, architectural representation as an abstract process became more perceivable. Using scientific methodologies in architecture with prescribed techniques directly goes back to Durand's writings between 1802 to 1813. This method, known as "technological construction", emerged against "artistic architecture" and created a new dichotomy between functional structures with decorations and building elements. Descriptive geometry and perspective, in

particular, transformed the simple tool of objectivism into a new visual instrument. Using the perspective as a tool and its importance made it difficult to understand a painting or a work of art in its real language. New theories were formed based on the concepts of Euclidean field of view and viewing angles, and it



Fig. 6. Michelangelo's Fortification Plan with the Idea of Defining the Shooting Angle
(Simitch & Warke, 2014)

7.3. Architectural Representation as a Simulation

Simulation refers to the imitation of appearance and personality of something (Akin & Weinel, 1982). Simulation means to imitate, and reconstruct a reality through mythical tools and patterns in such a way that the simulated reality can be separated from its original reality and replaced (Fakouhi, 2007, p. 321). In the early twentieth century, while descriptive geometry sought to define a precise event between representation and subject, modern art was regarded as a glamorous doing, which was defined by an indefinable distance between reality and the world of representation. During this period, some aspects of design were improved that had not been considered seriously in the nineteenth century, for example, the previously unknown aspects of descriptive and perceptual experiences which were invisible before. In this sense, architectural projects are no substitute for and imitation of anything else. They have no semantic load other than the emphasis on the dominant power structures and images they speak of. Baudrillard (1988) saw the infatuation of society in simulating the image process as a successor to reality.

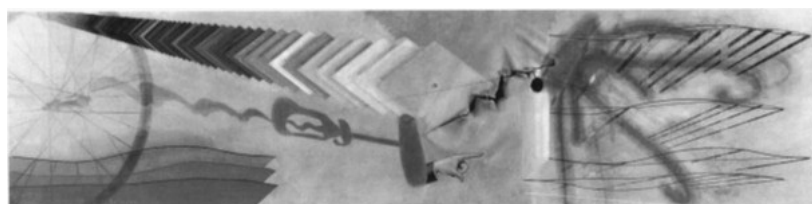


Fig. 8. Tu'M, Marcel Duchamp, 1918
(Gardner, Art through the Age, 2013)

was believed that geometrizing the depth of image had profound effects on global experiences as well as on architects (Figs 6 & 7). This point of view was a kind of shift from the natural perspective to the abstract perspective (Pérez Gómez & Pelletier, 1997).

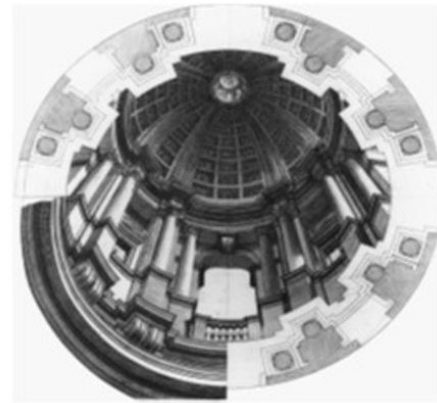


Fig. 7. Perspective Image of the Dropped Ceiling of the Jesuit Church, Vienna, Austria, by Andrea Pozzo
(<https://en.wikipedia.org/>)

By this image, the separation of reality becomes so hard that it seems as though the simulation has been fully established while we know this simulation does not represent the principles and the facts, and has no natural relationship with them. When designs and drawings come up as successors to buildings, and when a series of drawings attempt to create an image of the architectural site or its subject for the viewer, created buildings must also reflect the predicted qualities of their meanings and perceptions. So, a revelatory and metaphysical dimension is likely to create in them. This hypothesis was originally based on a linguistic relationship between design and building (Pérez Gómez & Pelletier, 1997).

Marcel Duchamp's (1918) oil painting, called "Tu'm", is an abstract of all perspective visual error for creating a vague intermediary. This work was the most explicit anamorphosis critique of the perspectivism distortion to its time. In this work, Duchamp discussed the gap between appearance and embodiment with his question. In fact, the realities of the image do not appear to the fixed viewer, but the other elements appear to the viewer moving around it, while the rest of the image elements disappear (Fig. 8).

Shojaee, S.M. et al.

For example, Morphosis Architecture Office seeks to stimulate a combination of forms with articulations of texture and materials. In the background of this office, the form composition is largely achieved through transparency of paper and plastic sheets (Figs. 9 and 10). In other words, in different media, representation becomes a creative, vital, and organic process that leads to both design development and thoughtful intuition in projects. According to Morphosis Architecture Office, representation is a major architectural experience of the building (Simitch & Warke, 2014).

Contemporary semioticians thus argue that the

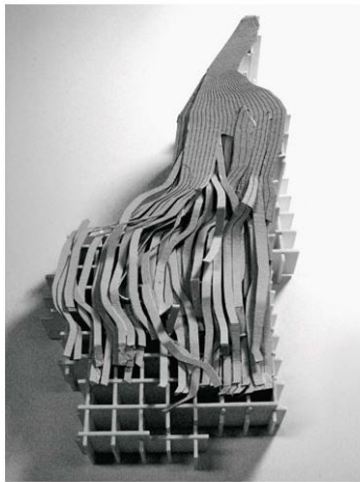


Fig. 9. Pratt Museum of Science and Nature, Tom Maine and Karen Harris, 2009

(Simitch & Warke, 2014)

materiality of the sign itself can be signifier and a sign itself is considered a phenomenon in the external world. All signs contain some form of material embodiment, whether it be a sound or physical mass, color, or body movement, or even a similarity (Voloshinov, 1973). In this way, codes refer only to their materiality, and refers the meaning to themselves not to anything else. Such contemporary representations have been able to add new tools and techniques to previous architectural codes since the twentieth century and also used past combinations in making reality in more novel ways.

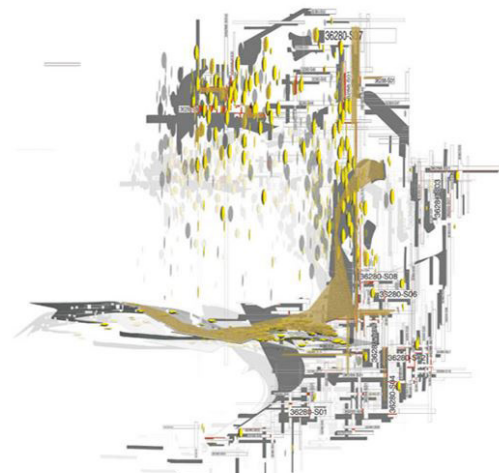


Fig. 10. PThe Original Design of Penang Turf Club, By Tom Maine of Morphosis Group, 2004

8. SEMANTIC ANALYSIS

Today, architecture, as a medium producing form and sense, always deals with physical limitations such as dimensions, scales, costs, and building codes as well as ideological limitations, which could originate from sociological or semantic contexts. These limitations extend the sense of architecture beyond the purely physical realm of construction and move architecture, as a medium, towards developing a solution to problems outside the context of architecture and continually introduce new codes in the field of architecture. That is to say, architecture should take into account all kinds of issues, including the physical values of shapes, sizes, scales, materiality of materials, as well as poetic symbolism, signs and meanings, and anything that can create codes to represent the building as a thing or a sign in the world.

Given the abovementioned explanation of architecture and media, and based on Berger's semantic analysis of media theory, there are three methods:

A) Paradigmatic structure and syntagmatic structure: The paradigmatic structure of a text focuses on the relationships between its elements and syntagmatic structure examines how the narrative evolves. In this

analysis, binary opposites are considered, such as nature and culture, death and life, superstructure and infrastructure (Sojoodi, 2008, p.15). Paradigmatic axis shows the relationship between the existing things and the factor of time has been removed, and on the syntagmatic axis or sequences, only one thing can be examined at a time, but all the things on the first axis are shown on them along with their variations (Berger, 2006, p. 19).

B) Intertextual analysis: Simply put, it refers to the conscious or unconscious use of the content of previously created texts in the new text. What texts are present in this text leads one to better understand this text. From Bakhtin's perspective, intertextuality is rooted in the dialogue way by which people communicate. What is said in a dialogue depends on what others said, say, and will say in the future (Berger, 2006, p. 19).

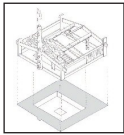





C) Metaphor and metonymy Analysis: Metaphor and metonymy are two important ways of conveying meanings. In metaphor, the relation between two things is raised by analogy, and one of its most common forms is simile. In the metonymy, a relationship is proposed based on an association. Metaphor is one of the figures of speech that transfer a meaning by analogy,

explanation or interpretation of something based on something else. Metaphor is not just a literary tool that poets and other writers use to produce certain kinds of emotional reactions but also it is part of how one thinks and communicates. In contrast, metonymy is one of the figures of speech that is transferred through the association of meanings and differs from metaphor (Ibid, p.20).

Given above, the following tables³ can be presented on the relationship between architectural representations and architectural codes by means of semiotic analysis. By combining the two quantitative and qualitative themes in a tabular structure and using a deductive way, the authors attempt to obtain and evaluate new results on how architectural codes and representations


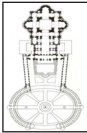




are interpreted. The three categories of architectural representation methods, alongside different types of architectural codes, are presented in three analytical tables by their periods and properties as well as related examples. Finally, according to this type of comparison, specific results are interpreted in architectural representation and codes to determine the capabilities of each representation method. It is necessary to explain that these data have been collected by a historical developed collection method based on authors' assumptions and theoretical orientations. In these examples, it was attempted to use the most recent books on architectural representations and to select and classify the most known examples for analysis.

Table 1. Eco's Semiotic Analysis of Architectural Codes in the Architectural Representation as Imitation and Mimesis

	Technical Codes	Syntactic Codes	Semantic Codes			
			Primary Function	Implicit Function	Ideological Function	Social Function
			(Roofs, stairs, windows, etc.)	(Facade, ventilator, etc.)	(Alcove, living room, etc.)	(Apartment, school, mosque, etc.)
						
	Fig. 11. Typical Haida House	Fig. 12. General Territory Showing Archeological Sites; Possible Reconstruction	Fig. 13. Ifugao, Philippines House; Plan	Fig. 14. Typical Southeast Ceremonial Area	Fig. 15. Stonehenge, England: Aerial View	Fig. 16. Pawnee Village, Kansas, USA
	(Jarzombek, 2013)	(Jarzombek, 2013)	(Jarzombek, 2013)	(Jarzombek, 2013)	(Jarzombek, 2013)	(Jarzombek, 2013)
Synchronic & Diachronic Semiotic Analysis (Paradigmatic Structure & Syntagmatic Structure)	-The contrast such as using stones against other unstable materials in construction	-The contrast such as the river, watercourse against the mountains and deep valleys	-The contrast of meaning Like refuge in trees for safety against living in the territory of other organisms	-The contrast of meaning Such as natural and artificial mark on its territory	-The semantic contrast such as choosing a cave to settle against outside the cave	-The semantic contrast like tribal group living against sporadic group living
	-The order of strength of the technical elements in building or The order of materials, from stone to wood	-The order of communication elements such as creating a path from the place of living to the hunting place as a safe way	-The order of architectural elements from the ground to the sky like construction the ceiling on the wall	-The semantic order of fields within its territory like definition of territory and place of living based on the mastery of it	-The semantic order of The hierarchy with The representation of cosmic forms like order in the semantic importance of the sun and moon	-The semantic order of collective power like the hierarchy from the place of living to hunting or fighting place







Intertextual Semiotic Analysis	-The impact on the concept of indoor and outdoor such as creating a frame by combining the basic technical elements against the unstable forms in nature	-The impact on the concept of near and far such as changes in the realm of living or fighting	-The impact on the concept of benefit by changing the technical elements to beneficial elements Like converting the column to the wall or vice versa	-The impact on the identifying the location such as turning the door to facade or symbol at the home of tribal elders	-The impact on the symbolic concept of elements such as turning the wall to the fence or fortification	-The impact on social concept of home such as the construction of the first fort to identify safe biological limits
	-The apparent similarity with natural structure Such as constructing the horizontal elements for cover against natural changes	-The similarity with nature such as finding the first natural paths to use in target location	-The Similarities with basic shelter such as building roofs to define the scope of living	-The similarity with the indirect functions of architectural elements such as creating a pile on the ground to detect location	-The Similarities with the customs derived from the collective beliefs coexist with nature such as primary similarity of the temples with mountains	-The similarity with the dominant discourse by representations of nature such as the patriarch's house as a social place in the tribe
Semiotic Analysis of Metaphor & Metonymy	-The proximity to the sky to represent the rules of construction on the ground such as constructing columns on the foundation	-The Proximity to the main elements of water, wind, earth and fire Such as creating the first path for burial	-The proximity to fire to make required tools and heat such as making the first stoves at home	-The Proximity with others for the representation of the human role such as building a fence or wall to define the limits	-The Proximity to circumstances of collective life such as creating the first room on the outside or inside home	-The proximity to the dominant discourse Like building a house together to create stronger society

Table 2. Eco's Semiotic Analysis of Architectural Codes in the Architectural Representation as Abstraction

Technical Codes	Syntactic Codes	Semantic Codes			
		Primary Function	Implicit Function	Ideological Function	Social Function
(Primary architectural elements such as beam, column, wall, etc.)	(Communication and spatial elements)	(Roofs, stairs, windows, etc.)	(Facade, ventilator, etc.)	(Alcove, living room, etc.)	(Apartment, school, mosque, etc.)
					
Fig. 17. Filippo Brunelleschi, Structure of the Dome of Florence Cathedral, 1419	Fig. 18. St Peter's, Rome, Plan Showing Bernini's Colonnade of 1656	Fig. 19. da Vinci, Leonardo Codex Atlanticus, Studies for the Tiburio of Milan Cathedral. Milan, Italy	Fig. 20. A Representation of View of the North Front of the Cross Isle of Beverly Minster	Fig. 21. Buonarroti, Michelangelo Base/Molding Profile Studies for San Lorenzo (Basi Di Pilastro Per la Sagrestia Nuova, Scritte Autografe, Florence, Italy	Fig. 22. Westminster Abbey before Construction in 17th Century
(Harbison, 2009)	(Harbison, 2009)	(Schank Smith, 2005)	(Schank Smith, 2005)	(Schank Smith, 2005)	(Harbison, 2009)

Synchronic & Diachronic Semiotic Analysis (Paradigmatic Structure & Syntagmatic Structure)	-Technical contrast in broad and narrow representation such as the gradual enlargement of the apertures	--The contrast of articulation and the paths such as creating Foris and its gradual development in the building against the paths with no joint	-The semantic contrast of utility in architectural elements such as ceiling height based on the function against the primary short ceilings	-The semantic contrast of The symbolic elements of architecture such as the semantic contrast of the inside and outside at home	-The semantic contrast of dominant and non-dominant such as representing the sense of domes and arches in the main hall of the building	- The semantic contrast of the house and city Such as building hospitals and museums in the city
	-The order of technical elements from hard to soft such as the use of materials according to their strength from outside to inside of the building	-The order of communication elements such as pause and move based on the response of the geometry to its needs	-The order of architectural elements from the bottom to top such as creating architectural elements according to being under or on the work than the ground	-The order of the architectural elements in a context such as the appearance of pediment pattern in the form of home	-The order of value of public to private rooms such as a guest room or hall alcove at home	-The rate order of enjoyment of facilities such as using the education system for those close to power
Intertextual Semiotic Analysis	-The impact on new meaning technical elements such as the composition of wall and beam, and the appearance of different kinds of arches	-The impact on the representation of the inside and outside such as the emergence of multi-functional spaces in the building	-The impact on the functional representation such as a load-bearing wall to wall separator	-The Intensifying of the symbolic meaning of power such as construction of urban landmarks or triumphal arch	-The impact of representations of symbolic concepts Such as the pattern of the church in villas or edifices	-The emphasis on social values of the building such as changes in church based on social issues
Semiotic Analysis of Metaphor & Metonymy	- Similarity with the structure of geometrical representation such as representation of columns based on the geometric shape of a cylinder or truncated cone	- Similarity with regularity and geometric proportions such as the relationship between architecture and human body parts	- Semantic similarity with common geometric shapes such as the building vestibule with a combination of geometric shapes	-The semantic similarity of abstract concepts of architecture based on the location and geography such as semantic similarity between the words "arch" and "architecture" in Latin	- Semantic similarity with conventional ideological signs such as the similarity of word passageway with the function of the space in the building	-The functional similarity of spaces required for community Such as functional similarity of schools and churches in Europe
	-The proximity to empirical science for providing an adequate structure such as the simulation of technical proportions as an allegory of human proportions	-The proximity to the older communication elements such as hall, lobby at the entrance with the development of the old entrances	- The semantic proximity to create a whole new meaning such as construction buttress and Gothic walls in highlands churches	-The semantic proximity with the concepts and phrases in the language such as the vicinity of words four walls and houses in the language	-The proximity to the ideological abstract meanings such as the vicinity of the domes and minarets in Islamic mosques or bell towers and pediment in churches	-The proximity to social meanings such as proximity of Aristocratic buildings with the government buildings in the city

Table 3. Eco's Semiotic Analysis of Architectural Codes in the Architectural Representation as Simulation

	Technical Codes	Syntactic Codes	Semantic Codes			Social Function
			Primary Function	Implicit Function	Ideological Function	
	(Primary architectural elements such as beam, column, wall, etc.))	(Communication and spatial elementss)	(Roofs, stairs, windows, etc.)	(Facade, ventilator, etc.)	(Alcove, living room, etc.)	(Apartment, school, mosque, etc.)
						
	Fig. 23. Mies van der Rohe, IIT Minerals and Metals Research Building	Fig. 24. Sketch plans for two Snowball Appliance Houses, 1995	Fig. 25. Mies van der Rohe's sketch of the Brick Country House, aka Brick Country Villa, 1923	Fig. 26. Sixth Street: Serigraph, 1988 Thom Mayne with Selwyn Ting and John Nichols Printmakers	Fig. 27. Aldo Rossi: Gallarate II Housing, Milan, Italy 1974	Fig. 28. Casa del Facsio, Giuseppe Terragni, Italy, 1932
	(Schank Smith, 2005)	(Schank Smith, 2005)	(Blaser, 1994)	(Simitch & Warke, 2006)	(Simitch & Warke, 2006)	(Frampton, 2007)
Synchronic & Diachronic Semiotic Analysis (Paradigmatic Structure & Syntagmatic Structure)	-The contrast of technical elements based on fabrication or pre-fabrication such as prefabrication of technical elements of the building in the factory at the same time	-The Static and dynamic contrast inside such as creating fluidity in space based on the composition of communication spaces with other spaces	-The semantic contrast in functional or decorative architectural elements such as using the minimum of architectural elements in apartments	-The semantic contrast of Economic use of space such as minimal housing in the international style	-The semantic contrast of freedom and space monopoly on the use of space such as taking advantage of the Libre plan to use the building functionally in contrast to the traditional view	-The semantic contrast of urban and rural life Such as Le Corbusie's residential project against his contemporary biological houses
	-The order of technical elements from pre-fabrication to fabrication such as chronological order of construction of architectural elements based on being either before or after the time	-The order of communication elements in order to create unity in space such as creating equal importance to the communication space and other spaces in modern architecture	-The semantic order of architecture elements from the functional to decorative such as the use of basic elements without decoration based on the functional definitions	-The semantic order from the inside to outside space Such as the combination of public, semi-public and semi-private sector in human habitat	-The semantic order of the outside to inside and vice versa to create a new perspective such as the use of glass walls or sliding windows in walls	-The semantic order of individual to social life such as creating the urban public spaces next to place of living
Intertextual Semiotic Analysis	-The impact on the concept of new technical elements such as creating new formal structures in architecture with advancement of structural sciences	-The impact on the concept of relationship and movement such as creating value in all the spaces with Libre plan	-The impact on the concept of primary elements of architecture such as stairs or elevator importance in modern spaces Layout	-The impact on the concept of space with the title change Such as a bedroom or living at home or in a residential neighborhood in the housing	-The impact on the ethical concepts in architecture and creating a new ideology such as the construction of similar buildings, with the international style	-The impact on the concept of the city and new urban neighborhood such as the use of modern high-rise building in medium and large cities

Semiotic Analysis of Metaphor & Metonymy	-The apparent similarities with classical technical elements such as three-dimensional structure design	-The similarity with communication elements of the building in terms of simulation such as designing of work triangle in kitchen	-The similarity with the aspects of the Pure and pristine environment such as rough surfaces in architectural elements	-The similarities with aspects intrinsic to the material and thematic structure of ancient architecture such as Wright works in the style of romanticism in the early twentieth century	-The Similarities with the basics and foundations of abstract representation of architecture such as Mies van der Rohe design based on the principles of Greek temples	-The similarities with concepts inherited from architecture and urbanism such as The definition of new cities in global view
	-The proximity to the environment and transparency of the technical elements such as the use of columns and beams as thin and impalpable	-The proximity of communication spaces with activity and pause spaces such as living room design based on its the communications and activities	-The proximity to technical elements such as combining elements of the first dom-ino in Le Corbusier's model for the modern home	The proximity of form and function in the design of architectural elements such as Le Corbusier's designs to image the proposed new functions in home	-The proximity to the modern intellectual and philosophical principles such modernist architects in the style of Futurism or Cubism	-The proximity to modern social life style such as creating new social applications like hotels for temporary stay

9. SEMANTIC ANALYSIS

Based on the findings of comparing the above tables, concepts derived from codes are classified into architectural representations (Figure 29). The proposed model has elevated our understanding of code types recognition and even architectural representations so that we can understand the role of the variety of signs in shaping architectural reality through these types of analyzes. So in order to have a regular system of the results of this comparison, they are represented

in the form of several graphs. It should be noted that understanding the systems of codes with different representation methods always leads to innovation in how they are used, and thus provides better expressive capacities for the designer. Structural and semantic relationships between the interpretive types presented also play an important role in the exploration of explicit and especially implicit meanings of codes in architectural representations, some of which are mentioned as follows.

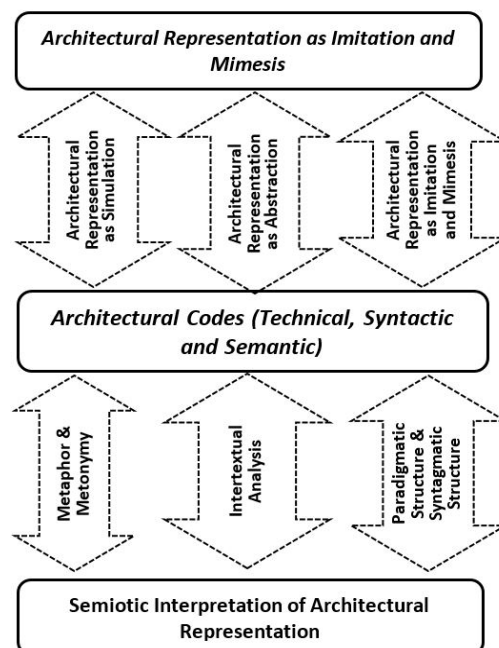


Fig. 29. The Semiotic-analytic Model of Architectural Representation Methods, Based on Eco's Architectural Code Theory

A) Paradigmatic and syntagmatic structure interpretation of representations in architectural codes
Paradigmatic structure analyses can address synchronous mutual codes in representing a work. Syntagmatic structure analyses also search for sequential codes in representations. The combination

of these two codes can create a time-dependent longitudinal and transverse texture in architectural representation. This texture can give rise to new meanings to depict the shape of time more completely, so these representations are directly related to human presence and are made based on it (Fig. 30).

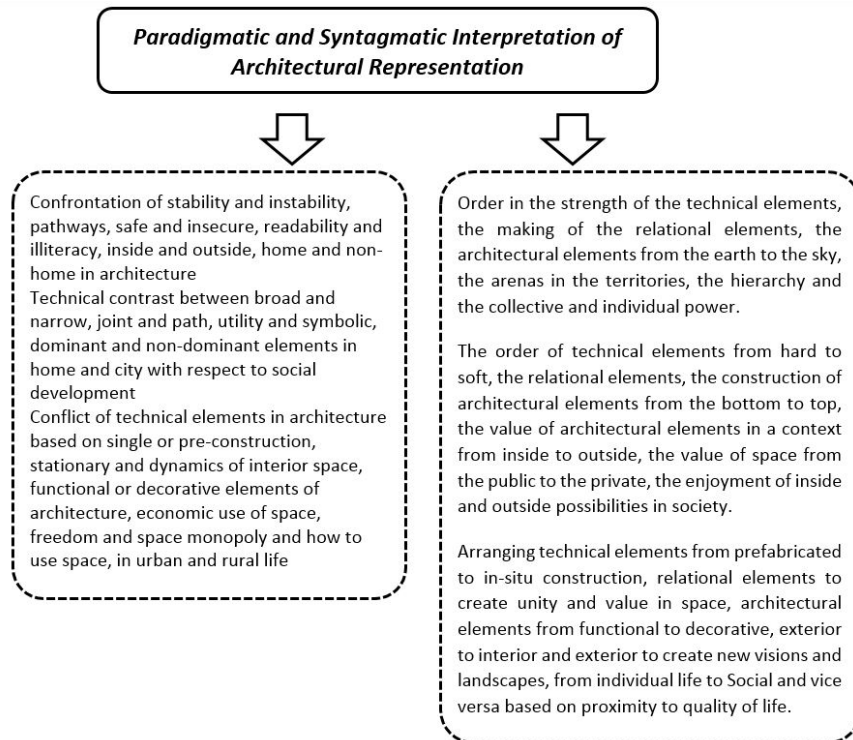


Fig. 30. Analytical Model of Paradigmatic and Syntagmatic Interpretation of Architectural Representation, Based on Eco's Architectural Codes Theory

B) Intertextual interpretation of representations in architectural codes
Intertextual interpretations deal with the extent to which representations are related. They aim to find

the impact of texts on each other and build richer interpretations in this area. These interpretations can create semantic relationships between representations of one or more works (Fig. 31).

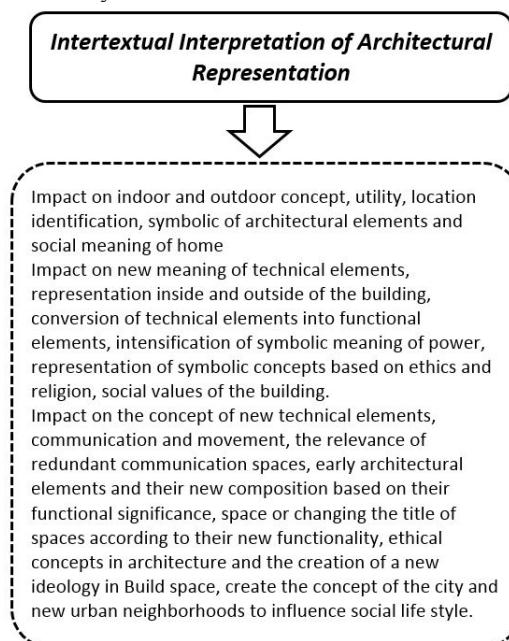


Fig. 31. Analytical Model of Intertextual Interpretation of Architectural Representation, Based on Eco's Architectural Codes Theory

C) Metaphorical and metonymical interpretation of representation in architectural codes

Given the importance of similarity in metaphorical interpretations and the use of simulation techniques in constructing codes, metaphorical interpretations potentially have an ability to analogize and are

generally used in typological representations. In contrary, metonymical interpretations address the form of codes with functional and constructivist orientations by entering the areas of association and semantic proximity (Fig. 32).

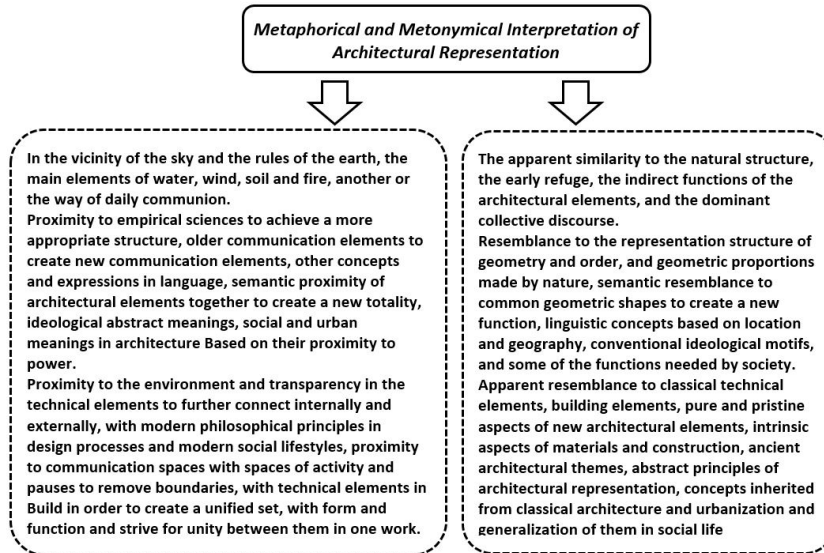


Fig. 32. Analytical Model of Metaphorical and Metonymical Interpretation of Architectural Representation, Based on Eco's Architectural Codes Theory

As such, one can obtain a graph based on the hierarchies obtained from a variety of architectural codes and outline the explicit and implied implications of the codes for making a representation as follows. Given the semantic interpretations and formulation of the findings, it seems that the explicit meanings of the technical architectural codes have a greater impact on the imitative role of architectural representation. The explicit meanings of syntactic codes have more tendency to the abstract role of representation and

the explicit meanings of semantic codes have more tendency to simulative role of representation. Of course, much of the signification is also devoted to implicit interpretations whose position is determined by their semantic proximity to any kind of architectural representation. Thus, by formulating close and coherent meanings in the result, one can know the assumptions of this study as a scientific result in the representation issue (Fig. 33).

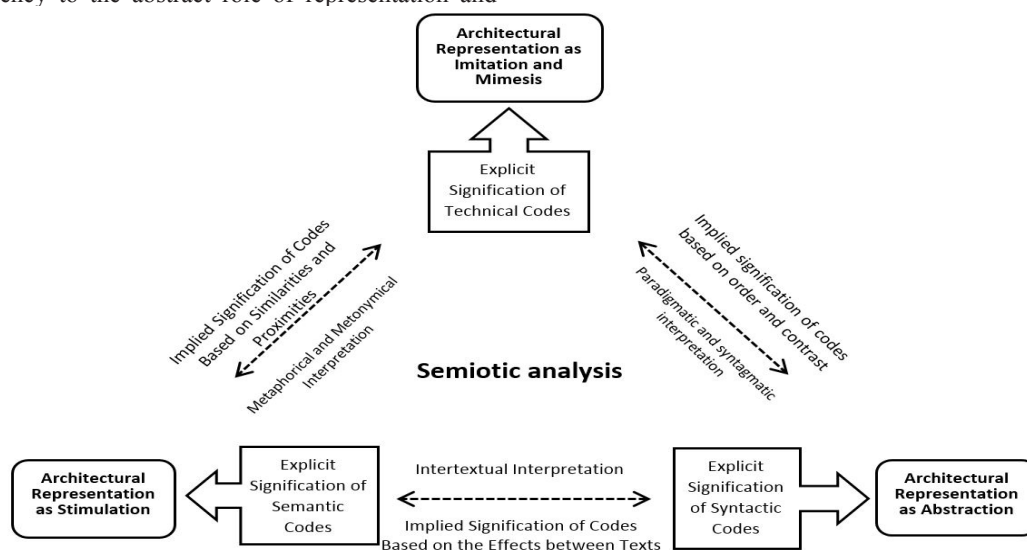


Fig. 33. The Semiotic Explanatory Model of Codes in Architectural Representation

END NOTE

1. These assumptions are based on an architectural dissertation entitled “Architecture Representation: Abstraction and Symbol within Design” conducted in 2012 by Anastsia Hiller in MIT School of Architecture in U.S.
2. Here, abstraction is a process of representation aimed at creating a strip in the classical architectural style. It is far from the definitions presented by the modern movement and focusing on functional substitution rather than tradition.
3. Due to the importance of the form of representation of the work, an image of each example is presented at the beginning of the analytical tables which, due to the limited dimensions, cannot be further clarified and must be scrutinized by referring to their references. These representations were either created at the time of construction or simulated during writing the book.

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