Semantic modelling as a means of forming an architectural object’s artistic image

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Abstract. The problem of the artistic image in architecture is of great importance, which is confirmed by scientific research in this area. However, the methods of an architectural object’s artistic image’s purposeful formation remain poorly understood. The method of designed object’s figurative structure semantic modeling is an effective way to search for an artistic image in the architectural design process. The technique is based on an artistic understanding of the designed object’s internal and external semantics. Concepts and archetypes of the projected object’s art-shaped structure are generated in the semantics comprehension process. Semantic modeling can be materialized in various forms, for example, in the form of a kind of matrix. The designer realizes a substantively detailed comprehension of the future object’s artistic-figurative structure by means of filling matrix cells with graphical or volumetric models. Based on the developed methodology, a series of experimental works and projects aimed at preserving and developing the Vladivostok’s architectural and artistic originality were carried out at the Department of Architecture and Urban Planning of the Far Eastern Federal University. Experimental testing has shown certain instrumental capabilities and effectiveness of this technique in working on an artistic image, both at urban planning and at volumetric levels.

1. Introduction

The problem of the artistic image is central to the theory and practice of architecture. Scientific interest in this topic is obvious, but the effectiveness of research in this direction is constrained by the complexity of the problem. The complexity of this question is due to the fact that architecture is an art that G.W.F. Hegel defined as “thinking in images”. And thus, not all the content of imaginative thinking can be explained from the rational-logical point of view.

The problem of the artistic image is reflected in a number of fundamental and applied works [1-14]. So, for example, the patterns of the city image’s formation revealed and the principles of creating perfect forms in urban planning formulated in the works of K. Lynch [1,2]. Issues of the urban environment’s semantics formation, accumulated in the concept of “the spirit of the place” are considered in the researches of C. Norberg-Schulz [3]. C. Jenks examines the regularities of the artistic language in architectural images of postmodernism [4]. Questions of urban spaces’ architectural composition are considered in the work of R. Krie [5], the aesthetics of the city - in the work of Z.N. Yargina [6]. In addition, issues of the artistic image, semantics of architectural space are addressed in studies of other authors [7-14].

Despite the large number of works in this area, the methodology of purposeful and effective formation of the artistic image in the process of architectural design continues insufficiently studied.
The questions of the relationship between the images, semantics of space and methods for achieving harmony in the urban environment during the project search remain poorly studied.

The purpose of this study is to develop the methodology for the purposeful formation of architectural objects’ artistic image, which allows improving the creative process during the design search.

2. Methods

The semantic richness and artistic perfection of the environment is the most important factor of its harmony. The artistic image’s richness and harmony arise as a result of a holistic and comprehensive understanding of the formative factors totality: natural-geographical, cultural-historical, socio-psychological, etc. The architect’s task is to identify and analyze all these factors, determine the main socio-cultural values and translate them into urban environment. This process is very complex because we are dealing not only with rational requirements, but also with spiritual values, which are very difficult to analyze and even more difficult to interpret in architecture. Success in this matter can be achieved if the architect has an effective technique for constructing the object’s artistic-figurative structure.

The methodology of artistic image creating is based on the purposeful design of the future architectural object’s figurative structure through a comprehensive analysis, notional interpretation and semantic modeling [13]. The scenario of this process includes the following main components:

1. analysis of the designed object’s socio-functional purpose and content, determination of basic meanings and significances;
2. development of an artistic-figurative concept of the object, including the definition of key metaphors and associations totality that reveal the image in the context of indicated content;
3. definition of specific compositional techniques and architectural forms, which allow us to identify and subsequently synthesize image elements into an integrated system based on associative-metaphorical perceptions.

The methodology of a systematic approach to the formation of the architectural objects artistic image is based on these components. Based on this technique, a number of experimental works and projects aimed at preserving and developing the architectural and artistic originality of Vladivostok were performed at the Department of Architecture and Urban Planning of the Far Eastern Federal University. The methodology was tested in undergraduate and degree design, as well as in competitive projects. In addition, this technique was used in the development of real projects in the V. Moor’ Architectural Studio [15-16].

3. Results

The methodology for modeling the artistic-figurative characteristics of the urban environment is based on metaphorical transfer and semantic resonance. Its essence lies in the search for associative metaphorical constructions (semantic archetypes) inherent in the object and reflecting its specificity. Initially, this is carried out in the form of the future object’s conceptual program. This program is implemented in the form of preliminary reflection and literary and artistic description of the concept and preliminary sketches of the future object’s main ideas. However, these sketches capture the main ideas, as a rule, not in the traditional form (plans, facades, sections), but in the form of sketches reflecting the artistic-metaphorical and socio-cultural essence of the future object. Sketches can relate to the life of the object, its figurative and symbolic structure, as well as other aspects and details.

Such description and sketching is a kind of penetration into the essence of the designed object, its conceptual modeling. It is carried out in the process of understanding the object “from the inside” and “from the outside”, as a result of the combined influence of internal and external formative forces. The internal semantics derives from the internal essence of the object - this is “what the House wants to be” (L. Kahn), including historical prototypes, the so-called “eternal historical themes”. External semantics are determined by the urban context - this is “what the City wants to see the House”.

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To illustrate the theoretical points put forward, we give several examples of this methodology’s implementation, which were tested by the authors of the project in the educational process at the Department of Architecture and Urban Planning of the Far Eastern Federal University. In particular, we give some examples of the search for artistic ideas based on the internal semantics of an object, as applied to the project of a comprehensive school. Thus, the idea of an “amphitheater school” suggests that there is a school-wide space (open in the form of a courtyard, or closed in the form of an atrium) in the center of the school. The whole life of the school is concentrated around this space. It is a recreation, a place of rest and communication, celebrations, public events etc. The historical parallel allows us to solve the structure and image of the school in a non-standard way. Another idea - “school-street” - means that the interior of the school is a kind of street on which all other rooms are “strung”. If we recall the statement - “street is the second school”, then this idea does not seem too strange. At the same time, it is obvious that an interesting and non-standard artistic move was originally laid in the solution of the school’s internal space as a street.

If we give possible examples of external semantics, we need to remember that Vladivostok is a sea city and, figuratively speaking, it would like to see sea features in the form of its "cells". From here come such imaginative ideas as the “school-ship”. By the way, this idea can also be comprehended from the inside, since life on the ship is also a kind of school, let us recall the study tours of sailing ships (for example, the frigate "Pallada"). Other examples of external semantics are related to marine life: these are “school-shell”, “school-bird”, etc. In this case, marine images will be present in the school’s shaping.

The search for the initial ideas that reveal the originality of the author’s concept is the most important stage in the design. Further work is associated with a consistent and targeted identification of these ideas in the spatial solution of the object. This is no less difficult stage, since we are talking about the most accurate and correct expression of the author's concept within the framework of architectural shaping’ possible means, without unnecessarily primitive and ordinary metaphors and associations. Firstly, the artistic "material" of the image is too thin matter, which does not withstand roughly expressed parallels. Secondly, this material is a lot of skillfully interwoven figurative threads-plots. There is no critical mass for a full-fledged artistic performance without this variety of interacting metaphors.

The semantic archetypes can be identified at various spatial levels of the urban environment, starting from the city as a whole (urban archetypes), then at the level of urban ensembles, then at the level of buildings and structures, ending with the level of fragments and details of the environment.

The semantic constructions of the city-planning level can be associated with the structure and orientation of city streets in relation to the water area, for example, in relation to Vladivostok, which has an expressed marine specificity. These streets form visual corridors, a kind of "road to the sea", and taking into account the relief - "steps to the sea". Another associative series - "city waves" - connects the sea surface with the three-dimensional structure of buildings, perceived from high elevated relief. The cascade and terrace-like construction of volumes falling over the terrain, as well as the rhythmic structure of the roofs, create the effect of the water area’s water surface - the “sea of urban roofs”.

The archetypes of the sea city are no less active at the volume level, i.e. at the level of buildings and structures. The sea semantics is manifested here in the dynamism of volumetric-spatial compositions and forms associated with the marine theme. Hence, the signs of ships, sailboats, waves, shells and other elements of marine life are in the architectural image of buildings. The same thing happens at the level of the form elements and details, as well as interiors decisions.

An architect provides the necessary content for the image by generating key metaphors inherent in the object, and embodying them in appropriate forms. The semantic modeling can be carried out in various forms, for example, in the form of a matrix kind that accumulates artistic ideas in their interconnection at various scale-spatial levels in accordance with the key metaphors. The designer realizes a detailed understanding of the artistic-figurative structure of the future object filling matrix cells with graphical or volumetric models. Of course, the elements of the image are only the initial
impulses in the formation of a holistic final solution. They need to be mutually linked to other formative factors, conditions and requirements in the design process. A holistic image is born as a unity of the diverse, however, in order for such synthesis to be possible, effective methods of preliminary deployment of the designed object’s figurative structure are necessary.

4. Discussion
For a more detailed discussion of the proposed methodology’s instrumental possibilities, we give an example of its application from a series of experimental works and projects aimed at preserving and developing the architectural and artistic originality of Vladivostok (figures 1-2). Vladivostok is a kind of peculiar Far Eastern city, the image of which is greatly influenced by the unique natural landscape situation (active terrain, the availability of water with a complex outline of the coastline). This city is also characterized by the specifics of cultural and historical development; it was formed under the influence of various national cultural traditions [17-20]. All this creates fertile basis for the peculiar architectural image search. It is necessary to have an effective methodology for the formation of the architectural object’s artistic image, which was discussed above, to successfully solve this problem.

Figure 1. The example of the designed object’s structural-semantic analysis. Graduation project "Social and cultural complex "Acropolis" at Crestovaya hill in Vladivostok” (author K.S. Romanov, supervisors V.K. Moor, A.G. Gavrilov, P.P. Pinimasov).

In the above examples, as in a series of similar works, we used the above-described method of targeted search for the architectural image of the designed object. Along with a comprehensive solution to all design problems, special attention was paid to the artistic search, with the goal of creating an environment saturated with vivid metaphors and associations revealing the originality and
maritime characteristics of the Vladivostok city. The work performed has shown the certain instrumental capabilities and the effectiveness of this methodology in working on the artistic image, both on urban planning and volumetric levels.

Figure 2. The example of the designed object’s structural-semantic analysis. Graduation project "Center for Slavic Culture in Vladivostok" (author O.Yu. Logunova, supervisors V.K. Moor, A.G. Gavrilov, P.P. Pinimason).
5. Conclusions
The formation of an architectural object’s artistic image in the design process can be based not only on intuition, but also on the conscious design of the projected object’s figurative structure through the semantic modeling. An objectively expanded variety of basic meanings and significances, meaningful in the categories of internal and external semantics, may be the basis for this process. The project interpretation of semantic concepts through associative metaphorical thinking allows us to create a set of artistic ideas that can be used as the basis for the projected object’s art-shaped structure. Thus, this technique allows us to work on the artistic image of the architectural object purposefully and effectively, and thereby contributes to the improvement of architectural design process.

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