Symbolism and functional organization of architecture of the Orthodox religious and educational complex

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Abstract: The focus of the article is a scientific investigation of the symbolism, functional organization and peculiarities of the formation of the Orthodox religious and educational complex and its components: the spiritual and educational centre and the monastery complex. The topic of the article is devoted to the study of cruciform structures and the actual scientific and applied problem of forming the conceptual foundations of religious and educational complexes. A place of worship is one of the few visually recognizable types in the entire architectural typology. It is the symbolism, which is one of the foundations of sacred architecture, that formed the visual expressiveness of the structures. The cross, as one of the main symbols of Christianity, influenced the formation of temple architecture. In general, the evolution of the symbol of the cross in architecture has created three basic types of structures: cruciform, cruciform transitional and circular. The above structures directly affect the formation of the architectural space of the sacral structures. On the basis of the established principles and techniques of construction of architectural and spatial solutions of buildings and structures of Orthodox architecture and the proposed method of architectural organization of Orthodox centres and complexes, it becomes possible to develop rational architectural and construction solutions.

1. Introduction

It is well known that spiritual and educational activities play one of the most important roles in forming the cultural centre of the community. It is the basis of many major functions of any sacred structure, such as the monastery complex. Therefore, these activities previously indirectly influenced the socio-economic development and economic life of the state [1]. Temples and monasteries are one of the ways of cultural and spiritual development of the population. Unfortunately, the buildings in the monastery complex do not always meet the modern requirements of society. If the development of the temple, as canonical architecture, is on-going, the accompanying buildings often remain traditional in a functional sense.

Influence on the formation of monastic complexes was mainly due to socio-cultural processes. In the dark periods of history around the complex were growing up the walls, turning it into a fortress. The inclusion of the monastery in the structure of the city caused the destruction of fortifications, except when the monastery itself was not a catalyst for the development of settlements around it. The most important effect is the separation of religion from the state, during which many buildings of the complex have lost their historical function and in need of refurbishment and the creation of new types of architectural spaces.

After analysing a separate building in the monastic complex identified the problem of the conversion of the greater part of those premises for modern requirements. This is true for educational institutions
(theological seminaries and academies) who need language laboratories, etc.; libraries that require electronic equipment; venues that require the use of furniture that can be transformed into a larger, mass homes that require a separate bathroom for each living cell, in fact, turning into a number of cells, with the prospect of development in the form of their completion, under the joint shell as well as the need gets spread arhontariks (from Greek αρχονταρίκον) where conducted spiritual conversations with pilgrims; Bishop's house, which requires changes in administrative functions, with possible space for a temporary stay of the Bishop.

Turning to history, architecture is based on a symbolic understanding of space. The proportions in the buildings were determined by the symbolic values of the forms. Using certain laws of geometry, the building turns out to be a sacred force. In ancient Greek and Roman temples, direct relationships were established between architectural proportions and cosmic models, and architects emphasized the idea of spiritual ascent. Similarly, Coptic temples \cite{2} and temples of the Balkan countries \cite{3} were formed in the same way.

The cruciform structure is directly connected with the sacral structures which are the centre of any religious and educational complex.

The modern requirements that are given by the society require the formation of a special area around the sacral structures, whose main function should be educational, religious and educational activities. This is very important in the countryside, where there used to be an enlightenment house at church and school.

Defining the Orthodox SEC (spiritual and education centre) is quite difficult because of the current content formation. The problem was investigated in the scientific works of PhD in Theology Priest O A Mumrikov \cite{4}, PhD in Pedagogic sciences S I Abramov \cite{5}, PhD in Pedagogic sciences T A Stanovskaya \cite{6}.

One of the forms of culture is leisure. Recently, the experience gained in pedagogy over the period of its development defines leisure activities in the following forms: holidays, entertainment, recreation, creative activity, self-education.

In modern conditions, the study of moral and ethical norms in Orthodoxy, in addition to traditional forms of educational activity, such as Sunday schools, has a practical manifestation of leisure activities in order to consolidate the obtained theoretical knowledge. It is suggested that an example of a leisure institution that would integrate all five of the above forms is a spiritual education centre.

Therefore, the article is devoted to the formation of the spiritual and educational centre as a type of spiritual institution whose main activity is leisure. Also, the topic of the article is devoted to the study the cross structures that may influence the formation of the Orthodox religious and educational complex.

2. Analysis of recent research and publications

The article analysed the scientific works of Sleptsov O S \cite{7}, Bulichova T V \cite{8}, Chen L Y \cite{9}, Stepanova I V \cite{10}, Gutnov A E, Lezhava I G \cite{11} and other. The last two scholars have devoted their work to urban planning.

Thus, the religious and educational complex, modelled on the heritage of the NER group (“New Element of Settlement”), also uses a similar concept for relatively independent living in any locality.

One of the trends in her scientific work Bulycheva T V studied different principles of function, functional process and zoning of sacred complexes. Stepanova I V summarized the following functional factors of formation of modern Orthodox temple complexes:

- clear zoning and consolidation of functions;
- creation of multifunctional centres and complexes.

The latter in turn was organized with the principle of blocking and cooperatives, as well as the versatility of the interior space.

It is established that the principle of multifunctionality as an example of the Autonomous existence of the complex is also the basis of the monastery. Clear zoning helps to speed up functional processes that take place in it.

In his book “Architectural design and reconstruction of Orthodox churches” Sleptsov O S has identified additional functions: museum, memorial, charitable, ethnographic and others. Also, the pilgrim road was added as one of the main object of the complex. It was also determined zoning. The
complex consists of nine areas: input; temple, memorial, office, household, educational, charity; sporting, recreational and economic.

Stepanova I V in her scientific work described the need to develop a more flexible space-planning structure that plays the decisive role in the formation of architectural ensembles.

Chen L Y in 2015, has considered the issues of historical designs of the Ukrainian monasteries of the XV – XVIII century. Analysis was by visual perception. You have defined the following composite solution:
- the temple forms an introverted space of the monastery complex and bell tower extroverted;
- Church and bell tower form the extroverted space;
- Church and bell tower form introverted and extroverted space.

Sleptsov O S found that the form of the monastery dominant contains the modern architectural and artistic features: imagery, economy and great acoustics.

The best of the forms was chosen as the rotunda.

Cruciform structures are indirectly linked to scientific research in various fields of knowledge. The terminological analysis of scientific publications provides a list of authors and terms related to the aforementioned structures. In Architecture: Kryvoruchko Y I ("Sacred") [12], Pavlov N L ("Natural rhythm") [13], Volegov A A ("Macrocosm, Microcosm") [14]. In Religious Studies and Philosophy: John of Kronstadt ("The Cross of the Primary") [15], Ostashova N V ("Symbol") [16]. In Art Studies: Zolotarchuk N I ("Processional Cross") [17], Kuzenko P Y ("Sign") [18], Bogomolets O V ("Solar Sign") [19]. In History and Archaeology: Kupriyanova O I ("Stavrography") [20].

The scholars identified above, have studied the problem and obtained the result in one way or another related to the religious and educational complex. This is due to the fact that the complex combines both the sacral complexes and the centres connected with the spiritual development of man.

3. Results

The concept of the spiritual and educational centre (SEC) is to supplement the liturgical, social and cultural functions. The SEC must meet all the requirements of leisure activities.

The three main functions of the Orthodox SEC are following: axiological; educational; family, creative and / or cultural and leisure activities. SEC specialization depends on the predominance of the any type of leisure. On the basis of the main functions, was formed the main zones of the Orthodox SEC: entrance; cultural and educational; cultural and leisure; administrative; office and household.

The features of cruciform structures consisting of directions and intersections have been established. The importance of architectural and spatial organization in the urban and architectural context is determined. A religious and educational complex consisting of a temple, monastery or temple complex, and a spiritual and educational centre may, by its architectural and planning decision, include a cruciform structure. Also, in terms of planning, the religious and educational complex is approaching urban planning. Therefore, its combination with the cruciform structure forms a centric, relatively timely accessible and dualistic development: at the same time compact and with a comprehensive perspective of development planning organization of the complex.

The following scientific studies of the above complex were tested by the method of experimental design. The religious and educational complex project consists of a monastery complex and a spiritual and educational centre. The main results of the study were presented at the XXVIII International Review-Competition of graduation projects of graduates of architectural and artistic specialities of higher education institutions of Ukraine, which took place in Rivne.

It is established that in the monastery complex there were gradual changes in the main and secondary functions, which directly influenced the functional process of the complex as a whole. The accompanying functional process of the monastery complex was constantly transformed, but, owing to the essence of monasticism, remained the basis of the autonomous system. Therefore, the perception of the monastery as an architectural ensemble has always been a major issue at the design level.

All functional processes were intended to ensure the relative independence of the complex from the environment, regardless of whether it was architectural or natural. It was the territorial location that influenced the premises program. Modern requirements have to approval the main and secondary
functions of the monastery complex, more detailed rules of design, revision of the functional processes that take place in it and attention to the achievements in other types of buildings and structures.

It is determined that the typical planning decision, in addition to the natural specifics of the monastery complex, prevents the actual individuality of the planning decisions as a whole. With regard to the space-planning decisions of the monastery complex as a grouping of the main and secondary premises into a single composition, the presence of such decisions is not possible due to the ensemble perception of the monastery as such. Therefore, it would be more acceptable to disclose problems through composite solutions. Compositional decisions emphasize the ensemble only in terms of changes in the dominance of the bell tower and the cathedral. These types of structures are always a compositional centre, and the accompanying structures are a functional need of the monastery complex. The typological planning decision is not always successful in the context of the monks' stay or visit to the laity.

It was found that the national influence on historicism did not bypass the principle of formation of the monastery complex. In a broad sense, the imitation of historical styles is sometimes referred to as religious cannons. From an architectural point of view, refinement is needed. Religious cannons have almost no effect on form, but are of great importance for the planning of sacred structures and the orientation of their individual elements around the world. Therefore, having determined the essence of the formation of the monastery complex, it is necessary to outline its problems. Over the centuries, elements of architecture have created unique shapes that are recognizable to any person and not confused with any type of building. New forms are not always accepted by society, perhaps because of fears of loss of visual difference among other buildings. Although moulding experiments have to take place because of the need for new construction. In foreign practice this need is not so necessary. Preserving historical monuments is more important than building new monastery complexes. Therefore, many questions in the formulation were raised at the beginning of the restoration of sacred construction in the last century.

On the one hand, the national influence on historicism did not bypass the principle of formation of the monastery complex. Thus appeared unique structures were created, for example, in the Ukrainian Baroque. It is especially organically organized around any monastery ensemble.

It is established that the construction of the monastery complex is one of the longest processes, but under the current conditions the question of its continued existence and active participation in the social life of the surrounding settlements remains open. Moreover, the need for educational activities in sparsely populated areas is not addressed by the construction of a cultural or educational home. Therefore, it was decided to expand the architectural typology of the religious and educational complex (REC). It has two main components: the monastery complex as a religious centre and the spiritual and educational centre as the centre of enlightenment. Therefore, such a REC is an adjoining centre and complex. In addition to the main, it includes minor complexes, such as the spectacular. Their number is not regulated and depends on the type of organization of the complex.

The analysis of typological planning decisions on the example of a generalized scheme of the monastery complex allows grouping all functional processes into seven components: the entrance group, the sacral, housing, socio-cultural, economic-production, social and household, educational.

The main function is divided into: religious, educational, uniting. The secondary function is divided into: agricultural, industrial, tourist.

It is determined that the form in the world of Orthodox monastery complexes is generally associated with national style and Revivalism. Of course, there are unique structures that are most dependent on unusual terrain. So it was decided to create a form that combines tradition and novelty. Using the method of exclusion for superfluous architectural elements, the form was created as the Christian symbol and was supplemented by a traditional architectural element, such as an arch. The ensemble uses a radial system with a dominant in the centre with parametric development. Thus, the cathedral remains the dominant of the monastery complex. If the bell tower is dominant, it is located separately from the monastery complex, but on an elevated relief, like the cathedral. Usually, the bell tower is a chapel, and a recreation centre and entrance group are organized around it.

During the analysis of the monastery complex, the main and secondary functions of the religious and educational complex were formed. The main functions are following: religious, enlightenment, educational.
The secondary functions include production, tourist, cultural and leisure.

The typological scheme of the complex consists of the centre, complex and related types of buildings and structures: spiritual and educational centre, monastery and entertaining complex, entrance group and cumulative square, two entrance gates and transport stops with parking lots, baptistery, bell tower with chapel. It is also necessary to create two recreational areas (Figure 1).

It is established that the planning of the complex in terms of approaching urban development.

Artistic concept has been created. It is based on a site that is already positioned as a sacral territory, it is in pristine condition. Therefore, it was decided to create a monastery complex that would restore the historic function of the territory. This complex will become the centre of spiritual life with all the necessary functions. It will include temple, enlightenment, living quarters, recreation area, catering, exhibition halls and assembly halls, convention rooms, parking.

Cruciform, transitional and circular structures were used at different planning scales. According to the provided structures, the concept of religious and educational complex was formed (Figure 2).

In order to put this idea into practice, the author interprets the typological planning scheme through the master plan into the planning scheme of the monastery complex. Conventionally, the concept is considered in terms of three aspects: functional, social, symbolic.

The value of the first aspect is the reproduction of the educational activities of the monastery complexes.

The second aspect is related to the need of society for spiritual development.

The third aspect is the connection of symbols and their religious and Christian explanations in terms of the symbolism of numbers, etc.

The symbols were divided into two categories: numeric and figurative. The first one is the number 8 and 10. In Christianity, eight means restoration and rebirth. Eight resurrections: three in the Old Testament, three in the Gospels, and two in Acts 9:20. The number eight in the Bible is the number of completeness and is associated with a new beginning - the beginning of a new life, a new era (2 Peter 2:5). The value of the number ten among Christians symbolizes the Ten Commandments of the Decalogue (Exodus 20:2-17), (Deuteronomy 5:6-21), the parable of the ten lamps, virgins (Matthew 25:1–13) and talents (Matthew 25:24–25). The second category is the image of a butterfly. Mainly the interpretation of this symbol related to the belief of Christians. In Christianity, the stages of butterfly development are embodied in life, death, and resurrection. Butterfly is sometimes depicted in the hand of a baby Christ. In accordance with the above aspects, the monastery complex and the spiritual and educational centre at it were designed. The religious and educational complex contains the symbol of butterfly (Figure 2).
The functional aspect is manifested in the spiritual and educational centre. The social aspect is related to the choice of terrain around the complex. The symbolic aspect became the basis for the organization of space at the urban and architectural levels.

It is recommended to use a cruciform transitional structure at the urban level but a circular structure should be used for individual architectural objects.

It is stated that the monastery complex has 5 main functional zones: Main temple area, living area, socio-cultural, educational function, economic production, social and household services.

Features of the planning solution are:
- at the level of transport links: intercepting parking, environmental friendliness, harmonious integration into the existing transportation system;
- at the level of the master plan: symbolism, parametric horizontal and all-round development.

The creative search for the dominant form of the monastery complex consisted of four variants. The best option is similar to a rotunda, bionic with a comprehensive facade inspection and has the shape of a Christian symbol with traditional tectonic architectural elements – arches.

It is determined that the result of creative search for the shape of buildings and structures should be based on a circular structure, taking into account the cruciform structure of the REC.

Features of the organization of architectural space are based on the interconnection and orientation of the dominant: the cathedral temple and the bell tower. Based on scientific research, it was decided to create an introverted-extroverted architectural space.

It is stated that the main function of the religious and educational complex is divided into: religious, enlightenment and educational. The secondary function of the complex is: production, tourist and cultural and leisure. Functional processes that take place in the complex, in addition to the processes of the monastery and spiritual and educational centre, include the processes of the spectacular complex, baptismal and pilgrimage paths.

The planning features of the religious education complex include: comprehensive development and symbolic placement on the master plan.

It is determined that a harmonious architectural space is created on two levels: enlarged (macro); medium (micro and meso).

The latest technologies allow you to create a flowing space between the interior and exterior, between the architectural environment and the architectural space (as defined by Y A Rochnyak [21]). Such space creates a visual and functional connection between the two levels.

At the enlarged level, space harmonization takes place through the visual and functional equilibrium of buildings or structures and the environment. On an average level, the harmonious architectural space of a particular typology is linked to its expressive concept, main features and functional zoning.

Aspects of the harmonious architectural space of the SEC are as follows:
- imagery – the visual and informational emphasis of the institution; occupies the facade of the SEC: it is completely, partially, part of the ensemble;
- recognizability – a visual and cultural sign of the institution;
- emotional comfort – harmonious perception by all organs of human feeling;
- self-understanding – the visual and functional communication of the institution; clear visual representation of functional zones;
- security and accessibility – the ability to freely get into all the functional areas of the institution;
- contextual – the spatial and informational content of the institution; preserving valuable architectural space and the environment, including historical and architectural monuments.

It is established that the cruciform structure has the following features: centrality and dualistic architectural and planning decisions. The architectural space acquires mono- and multifunctional properties. The vertical direction is connected to the dynamics, the way to the desired. The horizontal direction acquires a static meaning, namely stability. Additional directions, such as diagonal ones, are used to make changes to the structure while maintaining centrality. The use of these directions forms a transitional structure from which a new centric, for example, circular can be formed. Each type of structure is a reflection of the symbolism of Christian temples (Figure 3).

The architectural image is also a reflection of the symbolism in sacred architecture. An architectural image is formed at the intersection of a structure, regardless of the number of directions. Each direction...
is in a separate plane. The direction of the architectural image together with the vertical and horizontal directions in each plane forms a projection of the architectural image. These projections form an architectural image. Each structure is different in number of directions. The directions are as follows. The vertical direction is connected to the dynamics, the way to the desired. The horizontal direction becomes static, namely stability. Additional directions, such as diagonal ones, are used to make changes to the structure while maintaining centrality. The architectural image is a symbol in the cruciform and circular structures. In each structure, it looks different, because as the number of values increases, the type of structure changes (Figure 3). A circular structure was laid in the temple. Egg is stated as the architectural image. The total number of main facets of the temple reflect the symbolic meaning of the number eight.

![Figure 3. Main temple of the complex](image)

Temples in the form of a cross meant that the Cross of Christ is the foundation of the Church and the ark of salvation for people. Temples in the form of an eight-pointed star marked themselves The Star of Bethlehem and the Church as a guiding star to the Saviour research in the life of the future (eighth) century. Round temples mean the universality and eternity of the Church [22]. Thus, cruciform structure symbolizes the ark in the meaning of salvation, cruciform transitional structure symbolizes the Star of Bethlehem in the meaning of the way to salvation and circular structure symbolizes the universal in the meaning of eternity of Church.

4. Conclusions
It is determined that the existing perspective and need of modern society in the spiritual and educational centres is not reflected in reality due to insufficient study of the problems of organization of their architectural and planning structure and finally uncertain activity of the SEC, which actualizes the continuation of scientific researches of their architecture.

The Orthodox Spiritual and Educational Centre complements the sacral core with additional architectural spaces – leisure, recreation, rehabilitation, training, creativity, transforming the spiritual and educational centre into a religious and educational complex.

The features of cruciform structures are established. Their relationship with the design and perception of architectural space, such as sacral structures, is determined.

The symbolism of the religious and educational complex is formed by Christian interpretations of numbers and signs, cruciform, transitional, circular structures and architectural image.

Thus, the formation of an architectural image is possible by filling it with different meanings. For example, a characteristic feature of a sign is uniqueness, a symbol is ambiguity. The projection of an image is a sign and the image is a symbol formed from these signs.

As a result of the experimental design of establishments of this type, the analysis of the normative base for the design of sacral and public buildings of different specializations and scientific researches,
the functional zoning of educational establishments was determined and certain functional groups of premises were provided.

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