

Design knowledge in the artistic–aesthetic development and transformation of the world

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Abstract. The result of project activities is the adoption and implementation of decisions on the development and transformation of the world. Two related forms of project knowledge have a special influence on this process of project transformation: descriptive and prescriptive. This article contains the author's interpretation of the concept of “project knowledge” as a set of developed historical experiences, scientific knowledges and peoples’ skills, abilities, ways, means and individual project actions in the aesthetic transformation of the world. The purpose of this article is to consider the theoretical foundations of the formation of project knowledge in the aesthetic development and transformation of the world. An epistemological approach was implemented as the study’s methodology.

1 Page layout

Project knowledge, in the life of every person, regardless of the scope of its activities in the realities of today, is of increasing importance. It exists and develops from the moment when a person as a social individual and the subject of the historical process of development and social relations has been able to set goals, achieve them, create vital projects, and outline ways to achieve this goal. It is the qualitatively increasing human needs that are the creative source of the development of innovative, future-oriented project knowledge, which is the intellectual foundation and educational matrix of the progressive development of society. “Project knowledge” is the highest form of spiritual and practical improvement of the world, a joint way of forming a common historical perspective of social and natural construction [1].

The question of relevance and the specificity of project knowledge in the artistic and aesthetic transformation of the world draws us to a number of tasks and research questions: what is the source for the formation of project knowledge? What is the structure of aesthetic and axiological components of project knowledge?

The purpose of this article is to consider the theoretical foundations of the formation of project knowledge in the aesthetic development and transformation of the world. As a methodology, the study implemented an epistemological approach, in which project knowledge is defined as a special kind of social knowledge, as a set of developed historical experiences, scientific knowledges and peoples’ skills,

abilities, ways, means and project actions of man in the aesthetic transformation of the world.

Due to the fact that the studied phenomenon “project knowledge” is not sufficiently represented in the scientific pedagogical literature, we had to turn to the theoretical analysis and conceptual synthesis of the views of philosophers, psychologists and sociologists on the problem of the formation of project knowledge in the artistic and aesthetic development and transformation of the world. The development of fundamental questions about the nature of knowledge has been studied by scientists such as B. S. Galimov, G. B. Gutner, A. A. Isaev, A. F. Kudryashov, A. V. Lukyanov, F. M. Neganov, V. V. Tarasenko and V. N. Finogentov, among others. However, in the last few decades, the problem of the phenomenon of knowledge is perceived as an interdisciplinary problem of importance for representatives of various fields and branches of knowledge (both theoretical and applied, both natural and humanitarian) [2,3].

The main ideas of the activity-epistemological paradigm of education are aimed at the development of project knowledge as “intentional, reflexive-communication, root aspiration of human life” [3] – a person who is able to make responsible, professional decisions on the basis of a high level of knowledge of analytical, reflective and critical thinking, who knows the methodology and is able to apply methods to build optimal (optimizing) strategies and is aware of the tactics of ethically oriented dialogue interaction.

Perspective is the understanding of the phenomenon of knowledge and its aspects in the framework of the

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synergetic approach, revealed in the works of G. Haken, V. Xani, N. I. Trofimova and S. P. Kurdyumova, among others. In the theory and practice of professional education, the content aspect of project knowledge is revealed mainly and the specificity of the process of their development in the artistic and aesthetic development and transformation of the world is not sufficiently taken into account.

Materials and Methods

Project knowledge is a special kind of social knowledge. It cannot be reported to the subject: it is formed, developed and goes to the level of personal knowledge only in the process of activity. On the other hand, project activities cannot be carried out effectively without project knowledge.

Project knowledge is axiological, as it includes evaluation knowledge, which is the identification of correspondences (inconsistencies) between different sides of the project (conceptual, virtual and actual, real). This knowledge expresses the value attitude of the subject to the knowledge that underlies the problem under study to the object of design, the subjects of project activities and to the variant projects proposed in the collective creative search by others [4,5]. Such knowledge exists in all spheres, however, project assessments (risks) play an important role in the social and aesthetic transformation of the world.

In this regard, a number of researchers (V. R. Aronov, John. K. Jones, J. Dietrich, M. S. Kogan) are in agreement that transforming human project activity, commensurate with global and natural processes, makes it more urgent to predict and prevent the consequences of this activity.

Reflection is the process of self-knowledge of the subject of internal mental acts and states. Reflection can be carried out both internally (experience and self-report of one individual) and externally (as a collective mental activity and joint search for solutions). In the process of reflection, self-knowledge, self-development and self-regulation of the individual are provided. In the opinion of the author, it is not enough to simply equip students with knowledge of project activities and include them in creative educational activities. Therefore, it is necessary to teach the future engineer the ability to exercise reflection. Reflection of activity allows you to control the process of obtaining knowledge about the project; the rules of its construction; obtaining design results; and critically comprehending the stages of activity. Researchers, as forms of manifestation of reflexive processes, allocate criticality of thinking of the subject in activity, aspiration to evidence, to justification of the position, ability to raise questions, to conduct discussion, and also readiness for an adequate self-assessment [6,7,8].

Reflection generates two goals and, accordingly, two sides of the relationship "man – world": to express, to reproduce the world in itself; and to express, to reproduce itself in the world. Aesthetic development and the transformation of the world are not based on

scientific knowledge and concepts, and coherent artistic samples of such prominent designers as Corbusie, Gaudi, Gustave Eiffel, the architect V. Rastrelli, L. Bernini. These patterns of activity form in the individual the ability to perceive, interpret, appreciate and feel beauty, and to create (in our context, to design) according to the laws of beauty. Project knowledge is built by taking into account certain artistic (design) aesthetic and design rules (fundamentals of composition, rules of artistic combinatorics, features of artistic style, etc.). The architect in his professional activities should always work according to the laws of theoretical mechanics and the strength of materials, but what is equally important is that he must create according to the laws of beauty [9,10].

Personality-oriented education, based on the provisions of humanistic pedagogy, one of the main tasks facing the teacher, considers the creation of conditions for the manifestation of the innate human desire for actualization, development and self-improvement. Therefore, reflection is closely related to the student's aspirations for the future. This relationship is necessary for the development of project knowledge and the skills of the future engineer/designer.

Project activities can be carried out reproductively. Vector art is not only aimed at the transformation of the world, but it is also very important and key to transforming ourselves: "It is the creative activity of man that makes him a being turned to the future, creating it and modifying his present" [12].

The main feature and peculiarity of project knowledge is its social activity. The categories of "activity" and "activity" are in dialectical unity. Activity is a qualitative characteristic of a person's activity. D. I. Feldstein calls on modern Russian education "to prepare a person who is active, creative, creative thinking", focused not on "imitation" and "repetition" of the already existing experience, but on "creating a new, own way", which implies, in particular, the formation of the ability not only to assign the necessary amount of existing knowledge, but also "to creative attitude towards them with participation in their further development" [13].

However, design knowledge can be produced in various ways: either on the basis of the method of trial and error or on the basis of scientific methods. Therefore, the composition of project knowledge includes methodological knowledge, which is sometimes called "knowledge-skills": "Methodology is not only a "teaching" as a set of knowledge, but also a field of cognitive activity " [14]. There are two genetically related forms of project knowledge: descriptive and prescriptive. Descriptive knowledge in its idealized content is a theoretical knowledge of various generalized meta-connections and performs an instrumental role in project activities. It can be structured as follows: engineering, information, technical, cyber, social and others. It is knowledge describing the domain semantics in an unambiguous, formalized way [15,16]. They combine, on the one hand, expressive possibilities, and on the other, properties (physical, mathematical, logical, computational, etc.). Descriptive knowledge is the object under study (process, phenomenon, system) – it is called

knowledge: "what". In other words, descriptive knowledge answers the question of what is the subject of design, and prescriptive answers the question of how to transform it into a means of meeting the needs and aesthetic value of the transformation of the world.

Prescriptive knowledge (prescriptive) requires an algorithm of actions. It should be noted that the project is a prescriptive model. The project reflects the future desired state of the object, process, phenomenon and system that occurs when certain actions of people, and the presence of certain financial, labour, material, fuel, energy and other resources, including intellectual, cognitive, aesthetic, value. Prescriptive knowledge is the knowledge before the activity, the knowledge answering the question of how to transform the design object into a means of satisfying the need; they are also called "how" knowledge: "This is an image of a proper type or system of activity" [17]. Project knowledge is prescriptive knowledge: it indicates what a person should do and how a person should do it.

Results

As empirical research methods, we used generally accepted diagnostic techniques to record changes in practice-oriented situations. The study was based on the idea that the formation of project knowledge of university students requires the creation of a special educational space of epistemological interaction between the teacher and the student in an information-rich digital environment.

The objective of the experiment was to assess the concept of formation of project knowledge based on computer technology in the educational process of students of the university of building profile.

One of the most important components of the modern construction industry is the construction design. The quality of the project largely depends on the reliability of the construction project, ease of operation, aesthetic and environmental parameters, cost and commissioning time, among other issues. The main specific feature of the design is that almost all design procedures and operations – intellectual, requiring certain mental effort, creativity, knowledge, skills and abilities to create a virtual prototype of the object – are used. The whole design process can be represented as a sequence of a huge number of computational operations, procedures for finding information and selecting solutions and graphic procedures. The optimality of these procedures is not immediately obvious, and often there are situations when you need to change the previously made decisions and go back and check the calculations with the changed characteristics. In "manual" design, much of the time is spent on routine computing work, which does not fully ensure the creative nature of the design. Naturally, the desire of designers is to automate the formalized tasks and operations performed in the design. The unconditional condition of efficiency of the formation of project knowledge is the development of the concept of project education on the basis of computer technologies that will

allow us to produce highly qualified, versatile, educated and mobile experts, whose future professional activity is connected with design.

In this regard, the authors have developed the following software tools that implement the functions of training, monitoring the assimilation of the norms of project activities and searching for optimal technical solutions in the design:

- Software product "Information technologies in design"
- E-course in the Moodle system "Bases of automation of designing in construction"
- Software program "Automated system of designing of metal structures"
- Application program "Design of braced platforms"
- Electronic hyperlink manual "Information technologies in construction"

These software tools combine as functions of training and real design. These software tools have been tested and used in the educational process in special disciplines for students majoring in "urban construction and economy" and "industrial and civil construction" at the Orenburg State University.

During the experiment, we recorded the views of students of the faculty of architecture and construction, specializing in "Architecture", "Design" and "design of the architectural environment" about the place and role of the digital information environment in the learning process of project activities, about what is significant in their opinion and the necessary project knowledge for the implementation of all stages of project activities. The collection of information was carried out by observation, testing, questioning, interviewing, execution of project tasks and carrying out control sections.

Applying these methods in the educational process, we have collected enough extensive material for our study. Of the 97 students in these groups, 25.9% said: "Yes, of course, I would like to see more such programs"; 48.1% said: "after practical work with such computer programs easier to assimilate theoretical knowledge"; 22.3% said: "Yes, it helps"; and only 3.7% said that for them, it does not play a special role in the assimilation of new knowledge.

Discussion

Project knowledge in the artistic and aesthetic development and transformation of the world, according to S. L. Rubinstein, "is always presented in the human consciousness in the unity and interpenetration" of the two components that characterize knowledge as a "specific manifestation" and "a piece of" life of the individual "in the flesh and blood of him". The first component of "knowledge-thought" provides the co-occurrence of the content of thought with reality, and it is associated with "obtaining" and "extraction" of knowledge by reflecting reality and the invention of new ideas about it. The second component, "knowledge-information", is connected with the invention of methods

of “obtaining” and transformation of this knowledge and these ideas. In the process of formation of project knowledge, it is necessary to take into account these two distinct components.

Features of knowledge management in the educational process of the modern university are “systematization of work with intellectual resources (assets) and accumulated experience” in the aspect of “expansion, deepening, systematization, acquisition, exchange, use” [15], while knowledge is understood (justified) as a system-forming factor – “the purpose and essence” of higher education, where the main technologies of its acquisition (generation) are research and training [17].

A question remains debatable beyond the scope of this article: how, and under what laws, is descriptive knowledge (knowledge-thought) transformed into prescriptive knowledge (knowledge – information, action, algorithm)? And is prescriptive knowledge embodied in the structure of practical prescriptive design actions? This is the direction for future research on the problem of formation of project knowledge.

Conclusion

The theory and practice of vocational education reveals mainly the content aspect of project knowledge and not enough is taken into account about the specifics of the process of their development in the artistic and aesthetic development and transformation of the world.

Project knowledge is a set of developed historical experiences, scientific knowledges and talent of people skills, abilities, ways, means of appropriate actions and project actions of a person in the transformation of the world. It actualizes the aesthetic component of engineering creativity associated with the realization of the potential of a “kindred” attitude to the world and initiates the value attitude of future engineers to the acquired knowledge. In its maximum development, the project knowledge of the subject characterizes the engineering activities from the point of view of the unconditional existence of “intelligence”, “mind” and “talent”, offering a significant reason for the adoption and implementation of decisions on artistic and aesthetic development and the transformation of the world.

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