The Role of the Design Equipment Features in Projecting the University Educational Environment

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Abstract. The article presents the results of a functional sociological study of the design features of equipment for the educational environment of the university. The analysis of publications and directly university space of interiors testifies to the existence of a certain contradiction between the existing socio-technical environment of the university and the necessary equipment for the developmental education of students – of future designers. The problem arising from this discrepancy is the change in the object content of the medium by filling it with new equipment. The study was conducted by the team of teachers and students who, on the one hand, are active consumers, and on the other hand, they are given the opportunity to implement the most progressive ideas.

Based on the general characteristics of the architectural environment equipment, its typology and the connection of all environmental components, we have chosen different premises of the university. For each of them, a list of equipment was compiled, features were formulated, and only then was the design carried out. One of the main design features that was taken into account when designing equipment was shaping, which not only considered the functional purpose and ergonomic convenience, but also implemented an emotionally-oriented approach.

In the course of the functional-sociological research, the main criteria for evaluating equipment for the educational environment of public institutions were selected, the main requirements and design features were determined. In this paper, we have described: a hypothesis, a research model, a goal and objectives, and ways to achieve them, to obtain an effective result. Research methods are based on a comprehensive study of theoretical and design materials to identify the features of equipment design and the content of the educational environment based on the functional-structural methodology. Showing the students’ project proposals on the organization of the educational environment of NMSTU.
1. Introduction

The equipment design for the educational environment of the university is described on the example of NMSTU (Nosov Magnitogorsk State Technical University). The functional-sociological research studied the formation issue of a socio-technical environment and the object content of one of the public buildings types - the university. In design process project planning must begin with the essential characteristics determined by the social purpose of the object, which are reflected in the socio-functional organization of the educational environment.

Today, in most cases, the existing educational environment of the university, as a rule, is faceless, with a randomly selected object content and equipment that does not meet current trends, functional and ergonomic requirements and the needs of the younger generation. The lack of specific, narrowly focused developments to identify the accounting features of the equipment design for public institutions and their implementation in projecting of the educational environment is due to the lack of long-term research work to study the features of the educational environment of a higher school. The analysis of the offer market shows that there are some options for furniture filling and equipment, but they are rarely used to create university interiors, which can be explained not only by low funding, but also by low level of management awareness of the latest developments in this field.

The problem of our research is in contradictions between the existing socio-technical environment of the university and the necessary equipment for the developmental education of design students. The relevance of this issue is explained by: insufficient theoretical development of the issues covered educational environment features of higher education, the object content role and special educational equipment in it; poor implementation of design developments in the practice of designing equipment for the developing environment of higher education institutions; low information awareness of all the parties concerned.

The purpose of the study is to determine the functional and sociological features of the educational environment of the university, which affect the construction solutions in the design of the object content and equipment. The object of the study is the objective-spatial environment of the university. The subject of the study is a social group of consumers of higher education institutions. The research question is the operation of furniture and equipment for the interiors of the university development environment. The hypothesis of our study was formulated as follows: if we study the processes occurring in this sociotechnical environment, then on the basis of the findings we can change and improve its functional purpose and ergonomic convenience by creating appropriate equipment and content.

The study was conducted in several stages. As a result, the functional features of the interiors for various purposes were formulated, some methodical recommendations were received on the design of equipment and furniture filling, and project proposals were developed.

2. Materials and methods of research

The research is based on a comprehensive study of theoretical and design materials to identify the features of equipment design and the object content of the educational environment based on the functional and sociological methodology. The study was carried out by a team of teachers and undergraduates of the training area 54.04.01 "Design". The management of the University of Nosov Magnitogorsk State Technical University (NMSTU) commissioned to develop the object content of the interiors of the Construction, Architecture and Art Institute (ICAA) and stimulated this process. Initially, the study identified three groups of interiors for functional purposes: classrooms, recreation and departments. For each group, it was necessary to design the optimal equipment that facilitates the efficient flow of the corresponding functional processes. The optimal equipment was manifested in its design features. The study proceeded in three stages: theoretical, sociological and practical. The methods of each stage are presented in Table 1.
Table 1. Stages and methods of functional sociological research.

| 1. Theoretical                     | 2. Sociological                     | 3. Empirical (practical)          |
|-----------------------------------|------------------------------------|----------------------------------|
| analysis (functional,             | conversation;                       | observation;                     |
| comparative, systemic,            | survey;                             | linear experiment;               |
| ergonomic)                        | questionnaire;                      | learning design experience;      |
| hypothesis building;             | content analysis (statistics        | diagnostic procedures;           |
| classification by essential       | methods);                           | design-graphic modeling          |
| features                           | measurement                          |                                  |

3. Discussion
The discussion subject is the question of the design features of the equipment and the object content for each group of interiors expressed in the design proposals of students.

4. Literary Review
Scientific and technical progress and the socio-cultural life of the society have significantly changed the requirements for the socio-technical environment of public buildings, including educational ones. In the last decade, the concept of “educational environment” has been defined in pedagogy. This concept is considered in the works of Yu. P. Shapran, O. I. Shapran, V.A. Yasvina et al. Foreign authors also paid much attention to this concept. The educational environment is often viewed as a discourse within which teaching and learning is carried out [17]. The studies focused on social, psychosocial and pedagogical aspects, among which special attention was paid to the impact on students of their classroom environment on their cognitive and affective learning outcomes, which are most important for this study. Summing it up, the results show that student’s activity is more productive when the quality of the school environment is positively perceived (J. P. Dorman, B. J Fraser, G. J. Anderson, H. J. Walberg).

The domestic literature also studies the influence of equipment and object content on the educational environment in order to equip it as a specific spatial system (AA Grashin, V.T. Shimko, V.F. Runge, Yu.P. Manusevich et al.). The problem of psychological and emotional-sensory impact of the artistic and educational environment on students is also presented in the works of Russian authors [5, 10].

Partially, the methodology and stages of our experimental work are reflected in the publications of the authors of the following study [1, 2, 7, 8, 9, 13, 19].

5. Results
Functional sociological research was carried out with the participation of masters of area 54.04.04 “Design”, of the educational program "Interior and equipment". When analysing the interiors of the university during the theoretical stage, the notion of “educational environment” was defined - a natural and artificially created sociocultural environment of a person. The given notion includes object content and various educational tools that ensure productive activity of students and guide the process of personality development through creating favourable conditions for it. This environment is created under the influence of functional processes, in our case, educational, in which different people participate with their emotional-sensual mood, which paints the whole environment with positive or negative marks. But the environment itself evokes or supports those or other emotions. These relationships are shown in Figure 1.
Types of the investigated premises by groups.

Classrooms are design workshops that differed in need of special equipment. The first two courses carry out their projects manually, which means that we need easel tables for large tablets, respectively, special chairs or stools are needed. The audience should have storage tanks and demonstration equipment that is used not only for viewing, but also allows students to independently view projects during their execution. The classroom should have a computer zone and simple writing desks. All object content and equipment should create a serious, working mood.

Recreation. From the psychological point of view, students here experience other emotions of relaxation and active communication. The equipment and the subject content should be fundamentally different from the classrooms, primarily in the shaping. Color plays a big role.

Chairs. Interiors combine business rigor and human communication. Here are the working areas of each teacher, a place for common events, meetings and collective solving educational problems.

The second stage of the study, the sociological one, set as its task the study of the attitudes of students, teachers and university employees to the subject-spatial environment of the Institute of CAA. As a result, it became clear that most of the students and staff were not satisfied, first of all, with equipment and object content, which became a great incentive for further research and design work.

According to the results of the third empirical stage, the main recommendations were made for the subsequent design of equipment for the educational environment of the university: 1. It is necessary to develop specific types of multifunctional equipment for the existing university classroom fund, in accordance with specific social groups. 2. For each audience, it is necessary to develop furniture and complex equipment corresponding to the functional purpose of the room and type of activity. 3. There is the need to increase the classroom lighting. 4. Determination of the interior color solution influencing positively the psychological atmosphere and comfortable stay of people in it. The implementation of these recommendations made it possible to formulate more rationally the conceptual foundations of the artistic and imaginative solution and the implementation of projects by master students.

In the development of the project proposal masters used a single project methodology: 1) understanding the problem situation; 2) pre-project analysis; 3) the definition of principles and means of solving the problem; 4) the formation of a conceptual image; 4) the analysis of the project situation; 5) sketches of the project proposal; 6) design study and visualization. The result was a change in the sociotechnical developmental environment of the university, ensuring the effectiveness of its functional use and the students’ and teachers’ comfort.
Figure 2. Design proposal of the equipment and the object content of the department.

Figure 3. The design proposal of furniture equipment for the training workshop.

Figure 4. Design proposal of the equipment and the object content of the hall.

We formulated the following conclusions: 1. Conducted theoretical analysis revealed existing contradictions and confirmed the relevance of the problem, which confirms the need to create multifunctional equipment with regard to design features and based on functional and ergonomic compliance with the teachers’ and design students’ needs. 2. The sociological survey allowed to reveal the opinion of consumers about the advantages and disadvantages of the functioning of the existing educational environment of the university. The results allowed to confirm the hypothesis of scientific research. 3. The functional, ergonomic and design features of the equipment design for the educational environment of the university are determined. 4. A design proposal has been developed for furniture and equipment for the educational environment of NMSTU, Magnitogorsk.

This research work does not exhaust the entirety of the studied problem, showing the need for its further development. The findings and recommendations formulated as a result of scientific work can be used by designers in projecting the educational environment of public and private universities, as well as various youth centres.

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