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Petrashen Evgeniia Pavlovna

SYNTHETIC ENVIRONMENT DESIGN CONCEPT

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Associate Professor Kozyreva Elena Ivanovna

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INTRODUCTION

The candidate's dissertation is devoted to research and clarification of the content, role, conceptual apparatus and communicative aspect of environmental design as art, as well as the professional competence of the environmental designer within the framework of the concept being formed.

The relevance of research is determined by the growing demand for a high-quality living environment in society and the increasing complexity of creating such an environment.

The modern human environment is shaped by many factors of natural and anthropogenic origin. A significant number of resources, various specialists, technologies, and the results of scientific and creative activities of society are involved in the creation and maintenance of this environment. The human right to a healthy, safe and supportive living environment is a basic one and is not in doubt in economically developed countries, however, its practical implementation often faces problems of both a logistical, philosophical and cultural nature caused by insufficient integration of various fields of knowledge , as well as industry approaches in many areas of activity.

The interpretation of design as an art form also faces more and more questions. The reason for this growing complexity is, to a large extent, the process of convergence of science, technology and art, which forms, on the one hand, a “holistic” picture of the world, and on the other hand, requiring the development and implementation of interdisciplinary science-based projects for creating a living environment that provides the necessary functionality of the conditions and comfort of life, along with the cultural, artistic, aesthetic, hygienic and socio-psychological value of the environment, which reveals a lack of competencies among many participants in such design. To ensure this process, in environmental design it is necessary to form such a concept and principles of personnel training that would be able to take into account the entire complex of interdisciplinary problems and mutual influences in the design and reorganization of the living environment, as well as effectively interact with professionals from various industries involved in the processes of its creation , as well as maintenance, operation by

end users, and assessment of its quality after commissioning. Such work can be called a strategic task for the implementation of the national project Comfortable environment for living in Russia and the development of environmental design as an interdisciplinary art.

Experience in creating a comfortable environment gained within the framework of the implementation of the Federal project "Formation of a comfortable urban environment" of the national project "Housing and Urban Environment"[1], hereinafter referred to as the "Comfortable Environment" program, revealed the existing crisis in the design, creation and maintenance of a living environment in Russia, manifested in the form of numerous conflicts of interest, discrepancies in the understanding of key categories and concepts, areas of responsibility, difficulties in professional communication between representatives of architectural, landscape and urban planning spheres of project activity, the lack of a systematic approach to the management of project activities, as well as the presence of contradictions in society's requirements for quality and the very criteria for assessing the quality of the living environment and the principles of its maintenance.

The Sustainable Development Goals, adopted by both UN countries and Russia, also require the implementation of a number of principles that influence the development of environmental design in an interdisciplinary context, namely, taking into account environmental, sociological and economic aspects in all projects, including to overcome inequality in accessibility of a healthy lifestyle and ensuring safety for citizens, which affects both physical and psychological risk factors, including problems of accessibility of the environment, its aesthetic and sanitary properties. The communication aspect of environmental design is also of great importance for achieving sustainable development goals, including the educational and educational potential of environmental design.

It should be recognized that one of the problems of project activity in Russia is the gap between theorists and practitioners, as well as related profiles of professional activity and personnel training. This situation requires systematization and clarification of ideas about the concept of environmental design and the professional competence of an

[1] URL: https://gorodsreda.ru/ (date of access: 08/01/2021)

environmental designer, their presentation in a form that allows creating a clear theoretical and conceptual basis for further practical activities in this area.

In addition, there is an obvious need to deepen and expand scientific ideas and research in the field of environmental design, to ensure the mutual influence of research and practical activities in the interests of solving the set tasks of creating a comfortable living environment and overcoming the urbanization crisis, which has become especially clear during the pandemic. In particular, as part of training in the field of environmental design, it is necessary to ensure the formation at a high level of both scientific and analytical competencies and practical creative competencies of environmental designers.

The feasibility of developing a synthetic concept of environmental design is also determined by the need to form complex, interdisciplinary and intersectoral approaches in design to achieve sustainable development goals, including the formation of a comfortable environment. In this regard, environmental design should develop as a more interdisciplinary and human-centric approach to living environment design than the approaches of architectural and urban design, which should also determine the specifics of training in the field of environmental design.

The solution of these problems is hampered by a number of scientific, methodological and practical problems.

Scientific problems:

– insufficient research and consideration of the substantive and value aspects of environmental design largely determines the existing crisis in the design, creation and maintenance of a comfortable living environment in Russia, complicating communication at all levels due to the lack of a common understanding of the key goals and objectives of the formation of the environment;

– insufficient theoretical development of the subject area of environmental design and, as a consequence, ideas about the professional competence of environmental designers, determines the need to deepen and expand scientific ideas and research in the field of environmental design, ensuring mutual influence of research and practical activities in this area, in the interests of solving the set tasks of formation a comfortable environment for life and a way out of the urbanization crisis.

Methodological problems:

– outdated scientific and methodological approaches and principles, namely, the prevailing industry approach to design and the lack of scientific understanding of the results of project implementation is a significant obstacle to improving the comfort of the environment in Russia. The lag in the research segment of environmental design makes it impossible to overcome the catch-up and insufficiently systematic nature of the training of specialists and the development of environmental design as a whole;

– exhausted heuristics of tested research methods, which is expressed in the lack of systematization of the developing categorical-conceptual apparatus of environmental design, as well as the insufficiency of the evidence base for design decisions based on scientific circulation, the lack of clear criteria for determining the qualifications of environmental designers;

– the lack of methods and technologies that allow the training of environmental designers in the most adequate way to modern conditions, taking into account the use of the potential of the "triple helix" of interaction between the educational, scientific and industrial sectors of environmental design.

Practical problems:

– discrepancies in the value and personal orientations of participants and beneficiaries of comfortable environment projects lead to conflicts of interest in the implementation of projects of the Comfortable Environment program;

– lack of awareness about the possibilities and practice of creating and using a Creative Environment, along with a Comfortable Environment, especially in the education and training system;

– the absence of a professional standard and the position of an environmental designer in the staffing table according to the Labor Code of the Russian Federation, in the presence of an educational standard and active training of bachelors and masters in this area.

Beneficial effect from the study is determined by its strategic significance for solving the problems of the "Comfortable Environment" program, aimed, to a certain extent, at solving demographic problems and the problem of population outflow from

small towns and settlements in Russia, as well as achieving sustainable development goals. The development of scientifically based approaches to the formation of the content and principles of design and research activities and professional training of environmental designers will ensure increased efficiency in the implementation of national project programs, since the level of professional competence of an environmental designer often becomes a key factor in achieving or not achieving design goals, as well as the very possibility of setting adequate goals design. The development of ideas about the essence, as well as the value and theoretical foundations of environmental design, scientifically based approaches to environmental design, will bridge the gap between research and design activities, introduce the practice of assessing objects after commissioning and systematically take into account the experience gained in the development of science and environmental design practices.

Thus, **scientific problem** of the research is:

1) the lack of a holistic concept and inconsistency of scientific ideas about environmental design, which impedes effective work in this area;

2) insufficient development of scientifically based criteria for assessing the quality of the living environment, for setting design goals, achieving balance and sustainability of design solutions;

3) outdated methods of training personnel in the field of environmental design, which do not develop in them the necessary interdisciplinary professional competence to ensure comprehensive integrated design.

Research hypothesis believes that these problems can be successfully resolved within the framework of the development of a synthetic concept of environmental design, representing environmental design as an interdisciplinary art form that synthesizes scientific and artistic approaches to research and design activities, through the development of a system of models of its content, conceptual apparatus, goals and values design taking into account the communicative aspect of environmental design. This concept and the form of its presentation will allow: to clarify the role of design in creating a subject-spatial environment; improve the methodology for designing a favorable and comfortable living environment; increase the efficiency of professional communication

in the field of environmental design. It is also assumed that the use of the communicative potential of the “creative environment” in environmental design, as a developing environment that promotes creative activity, including the training of environmental designers, can contribute to the preservation, popularization and actualization of cultural heritage objects.

Degree of development of the research topic at the present stage seems insufficient. The study of domestic and foreign scientific literature on the topic of the dissertation showed that scientific ideas about environment design represent a significant range of concepts that intersect with each other and with other areas of knowledge, such as various types of design in industry, architecture, urbanism, landscape architecture, etc., from art design to design for sustainable development, but does not provide a sufficiently holistic view of environment design as an art form and professional field.

The development of the environmental approach in architecture, as well as the identification of environment design as a separate area of professional training, was influenced by the works of such outstanding scientists as Gale Y., Genisaretsky O.I., Glazychev V.L., Zabelshansky G.B., Lynch K., Norberg-Schultz K., Rappaport A.G., Gutnov A.E., Ikonnikov A.V., Runge V.F., Somov G.Yu., Ellard K. et al. Various design concepts in general, which subsequently spread and on understanding environment design, are presented in the works of Mironenko V.P., Vergunov N.S. and other researchers. In particular, the understanding of environmental design as a type of artistic design is characteristic of G.B. Minervina. and Shimko V.T., while its study in the context of sustainable development goals is typical for Deniz D., Lewis H., Steiner Fr. Among the studies in related fields of knowledge that are directly related to the problem of understanding the nature of environmental design, it is worth noting the works of Kapustin P.V., Zhuykova S.S., Lebedeva G.S., in the field of architectural theory, Bazilevich A.M. in the field of landscape architecture, Runge V.F. in the field of the history of design in connection with the history of science and technology, in particular, interior design, Nefedov V.A., Esaulov G.V., Bolshakov A.G. in the field of landscape and urban planning to achieve sustainable development goals, Mironenko V. P., Vergunov N. S.,Norenkov S. V., Krasheninnikova E. S., Orlova N. A., Orlov D. N. in the

field of architectural environment design, Martyshova L. S. in the field of modern problems of architecture. Environment design itself, including its aspects and directions, as a type of design and area of research, is studied by such Russian authors as Malin A. G., Ushkina I. M., Gurko I. S., Kozyreva E. I., Barsukova N. I. and many foreign researchers, for example, such as Geist V., Krasner L., Mihinjac M., Saville G., Rapoport A.

Insufficient development of scientifically based criteria for environmental comfort in terms of achieving balance and sustainability of design solutions, despite the fact that issues of urban environmental comfort can be considered one of the most actively studied. Among the researchers to mention are Kochetkova T.V., Aleynikova N.V., Polyakova N.V., Zaleshin V.E., Polyakov V.V., Egorova N.T., Zinkovskaya A.A., Petrov V.P., Sitnikov P.Yu. However, directly needs of modern society in the field of design environment and related methods of “post-occupancy assessment” of various environmental objects are given insufficient attention in domestic research, although they are recognized by modern science as fundamental sources of knowledge for the development of evidence-based or science-based environmental design and have recently even been included in the National Standard of the Russian Federation. Federation "Comprehensive improvement and operation of urban areas"[2]. These and related issues are explored in the works of Kiyanenko K.V., Bystrova T.Yu., Anisimova L.V. and others. Among foreign authors, one can note the works of Roberts, C.J., Edwards, D.J. A new source of scientific data for design activities, actively developing in the last decade, has become neuroarchitecture, synthesizing cognitive, medical and neurobiological research with design and conceptual modeling in both architecture and design. Among Russian researchers in this area, Noskovich S.N., Korytova O.N., Mukhitov R.K., Gordeeva A.E. stand out. The Academy of Neuroscience in San Diego, California, USA has become an important center for scientific research at the intersection of neurobiology, medicine and architecture. Without taking into account this modern direction of research,

[2] "GOST R 70390-2022. National standard of the Russian Federation. Integrated improvement and operation of urban areas. Sociocultural programming. Basic requirements and processes" (approved and put into effect by Order of Rosstandart dated October 10, 2022 No. 1097-st). M.: FSBI "RST", 2022. Document provided by ConsultantPlus: www.consultant.ru (save date: 04/18/2023)

the search for innovative solutions for the development and refinement of the concept of environmental design in the context of the convergence of science and art is hardly advisable.

The current situation of inconsistency and vagueness of the categorical-conceptual apparatus of the subject area of environmental design leads to significant difficulties in organizing the process of training personnel for environmental design and assessing the professional competence of environmental designers, in order to integrate them into practical work, which reduces its effectiveness. The works of such Russian authors as: Bakhlova N.A., Davydova E.M., Pankina M.V., Radchenko V.Yu., Radchenko O.S. are devoted to the problems of personnel training in environmental design; among foreign researchers the following stand out: Preiser W.F.E., Jones C.C., Steiss A.W., Steinitz C., Edwards B.W. In particular, the works of Garcês S., Pocinho M., Neves de Jesus S., Viseu J. N. are devoted to the tasks of creating a special environment for the manifestation of creativity of creative individuals.

Thus, taking into account the debatable nature of the issue and the complexity of mastering the content of environmental design, along with the need to systematize this area of knowledge to increase the efficiency of design and training, we can conclude that the following aspects of the scientific problem are insufficiently developed in the listed studies:

– a generalized and visual representation of the content of environmental design as a holistic concept;

– a systematic representation of the categorical-conceptual apparatus of the subject area of environmental design, as an interconnected and hierarchical structure, reflecting the interdisciplinary connections of environmental design;

– determination of the principles of goal setting in the field of creating a living environment, taking into account the characteristics of the functioning of the environment to determine design goals;

– a systematic idea of the professional competence of environmental designers, means and methods of its formation and assessment.

Object of study – environmental design as an interdisciplinary art form.

Subject of study: theoretical, methodological and communicative aspects of environmental design.

Compliance of the dissertation with the Passport of the scientific specialty 5.10.3. Types of art (technical aesthetics and design) are determined by the following areas of research: 53. General theory and history of design. 55. The role of design in the formation of the subject-spatial environment. 58. Communication aspects of design.

Purpose of the study – to develop a synthetic concept of environmental design and present it in the form of a system of categorical models reflecting the mutual integration of research and interdisciplinary design and practical creative activities in the field of environmental design.

To achieve this goal, the following were set and resolved in the work: **tasks:**

1. Study the basic concepts of the development of environmental design and develop a system of models of content and conceptual apparatus of environmental design, reflecting the synthesizing role of design in the formation of the subject-spatial environment;
2. Identify the key parameters that define the goals and boundaries of design in the synthetic concept of environmental design, and develop tools that allow them to be taken into account in research and design activities.
3. To study the communicative aspect of interaction between the subject-spatial environment and the user based on the synthetic concept of environmental design and the theory of creativity, using the example of the phenomenon of a creative environment.
4. To develop principles for developing the professional competence of an environmental designer that meets the objectives of ensuring the communicative, supportive and developmental role of environmental design
5. Conduct an empirical study and testing of the proposed concepts in research and creative work using the example of the implementation of the main educational program “Environmental Design” of St. Petersburg State University (hereinafter referred to as the “Environmental Design” program of St. Petersburg State University).

Theoretical basis of the research are formed by the fundamental principles of a number of scientific theories and concepts, such as: the concept of sustainable

development[3], theory of convergence of science and art[4], creativity theory[5], "Comfortable environment" program, system-categorical approach as a general scientific research methodology, theory of dynamic information systems and homeostatic theory[6]. We also used competency-based and personality-oriented approaches to personnel training, a method for constructing logical-semantic models[7], a method for constructing a competency profile, developed as part of the "Concept of an open format for citizens' competency profiles, trajectories of their development and procedures for their creation", developed as part of the implementation of the federal project "Personnel for the Digital Economy" of the national program "Digital Economy of the Russian Federation"[8].

Information base of the research includes articles and monographs by domestic and foreign scientists devoted to the issues of the environmental approach and the theoretical foundations of environmental design, issues of convergence of science and art, the theory of creativity and its application for the formation of a creative environment in educational institutions and creative associations, statistical and other information in the field of environmental design and personnel training.

Novelty of the work consists in the fact that for the first time a synthetic concept of environmental design has been developed and presented based on the clarification and systematization of ideas about environmental design as an interdisciplinary art form, in the form of a system of interrelated and scientifically based models; a system of models of theoretical foundations of environmental design in a practice-oriented context of achieving sustainable development goals based on the paradigm of the convergence of science and art is proposed; contradictions in the criteria for environmental comfort were

[3] Decree of the President of the Russian Federation "On the Concept of the Russian Federation's transition to sustainable development." URL: http://pravo.gov.ru/proxy/ips/?docbody=&firstDoc=1&lastDoc=1&nd=102040449 (access date 07/16/2022)

[4] Baksansky O.E. Convergence: methodology megascience // Philosophy and culture. 2014. No. 4 (76). S. 505-518.

[5] Rhodes M. An analysis of creativity // The Phi delta kappan. 1961. T. 42. № 7. C. 305-310.

[6] Boush G.D., Razumov V.I. Methodology of scientific research (in candidate and doctoral dissertations). M.: Infra-M, 2020. 227 p.

[7] Website of the Research Laboratory for Modeling Visual Controls of Logical-Semantic Type. URL: https://bspu.ru/unit/286/news (access date: 07/01/2022)

[8] The concept of an open format for the profile of citizens' competencies, trajectories of their development and the procedure for their creation. URL: https://digital.gov.ru/uploaded/files/kontseptsiyaotkryitogoformataprofileikompetentsii.pdf?utm_referrer=https%3a%2f%2fwww.google.com%2f (date of access 07/01/2022)

studied and identified in the form of developing a system of models and creating a “design code matrix” of environmental comfort and creativity for programming design goals in environmental design, pre-design assessment and post-assessment of its quality parameters; development scientifically based categorical models functioning of the creative environment, the formation and assessment of the professional competence of environmental designers, contributing to the increase in creative productivity, creativity and professional competence of environmental designers, the formation of an individual competency profile, as well as overcoming industry approaches that impede the implementation of the Federal project "Formation of a comfortable urban environment" of the national project "Housing and urban environment." Examples of the use of the proposed models in the educational and creative process have been developed based on empirical experience gained during the implementation of the “Environmental Design” program at St. Petersburg State University.

Provisions for defense:

- The content of environmental design, within the framework of the synthetic concept, is interdisciplinary research, design and creative activity aimed at achieving a balance of architectural and design activities and mutual influences of the sociocultural, economic and environmental spheres of human life and society, in the process of shaping the human environment, which determines theoretical and value basis for the formation of a subject-spatial environment;
- the conceptual apparatus of environmental design combines ideas about architectural, spatial, engineering, construction and operational solutions in the formation of the environment (answering the question “what?” in accordance with the planned life cycle of the object), consumer, functional and environmental value of the created environment (answering the question “how?” in accordance with the desired level of quality of project implementation) and the artistic and aesthetic image of the environment based on the sociocultural ideals of society as a design goal (answering the question “why?” in accordance with the expected effect of the project);
- the boundaries, goals and objectives of design in environmental design are determined by the choice of a balance of parameters of uniqueness and universality,

comfort and creativity of the environment based on the principle of mutual complementarity;

- the creative environment influences creative productivity and increasing the professional competence of artists in general and environmental designers in particular, through visual, cognitive and perceptual stimulation of creative and cognitive activity; the formation of a creative environment is possible on the basis of an information model that includes four parameters of the environment's creativity: "Press", "Process", "Person" and "Product"; the result of the influence of the creative environment is both a creative work and an increase in the professional competence and personal creativity of the "Person";
- The professional competence of an environmental designer includes eight groups of active competencies: personal communicative and sociocultural competencies; artistic, visual and information technology; design thinking and research competencies; design and technical and economic competencies, which ensures the possibility of implementing the synthetic concept in the practice of environmental design; a sufficient level of formation of all active qualities of competencies becomes a necessary condition for complex interdisciplinary interaction and overcoming the sectoral approach to the sections of design and operation of environmental objects; the mutual complementation of unique individual qualities of competence in a creative environment increases the effectiveness of professional activities and the development of relevant competencies of the entire creative team and each of its participants;
- the practical use of a system of models of a synthetic concept of environmental design, a creative environment, the formation of creative teams for the development of projects, as well as the training and development of personnel in environmental design, increases the quantitative and qualitative productivity and effectiveness of research and creative activities in the field of environmental design.

Theoretical significance of the work is to develop scientific ideas about environmental design and its role in the system of types of creative activities and research related to the tasks of shaping the human environment; clarifying the theoretical foundations of environmental design, expanding the methodology for using the theory of

creativity and the concept of a creative environment as a special environment favorable for creativity, which made it possible to propose a synthetic concept of environmental design and develop a system of conceptual models for the formation of professional competence of an environmental designer and methods for assessing the qualifications of an environmental designer based on key active qualities of professional and trans professional competencies within the framework of the proposed concept.

Practical significance consists in the possibility of improving design methods and conducting research in environmental design based on a synthetic concept, increasing the productivity of creative activity using the effect of a creative environment, improving the quality of training in environmental design, the possibility of forming an individual profile of professional competence of an environmental designer and creative teams based on complementary profiles competence.

Scientific principles and results, conclusions and recommendations formulated in the dissertation are supported by the use of categorical-systemic research methods and logical-semantic modeling, the clarity of the graphical representation of the results obtained, as well as the actual results of testing the obtained models in practical work. The research materials were used in the educational process, coursework and diploma design as part of the implementation of the main educational program “Environmental Design” at St. Petersburg State University.

Testing and implementation of results research work was carried out directly during the research. On the topics of sections of the dissertation, reports were prepared at a number of scientific and scientific-practical conferences at the international, all-Russian and regional levels, for example, such as: Annual conference “Topical issues of preservation and popularization of cultural heritage” (2023): “Continuity as a factor in the development of restoration industries"; Annual independent conference of professionals in the field of urban development “Urban Forum 2023”; All-Russian Conference on Natural Sciences and Humanities “Science of St. Petersburg State University – 2022”, “Science of St. Petersburg State University – 2021” and “Science of St. Petersburg State University – 2020”, Annual international conferences of the International Association of Landscape Architects ICON-LA, including the World

Congress on Landscape Architecture (2015 g.), First Chinese-Russian Forum of Culture and Art (2017), International Conference "Health Equity: The New Urban Agenda and Sustainable Development Goals: 14th International Conference on Urban Health» (2017), II international scientific and practical conference “Design and artistic creativity: theory, methodology and practice” (2018), Annual International Conference “The Fate of Man is the Fate of the Earth” (2011, 2012, 2021), II Interregional Scientific and Practical Conference “Modern Public Spaces as a Tool for the Development of the Urban Environment” (2018, 2020); II scientific and practical conference “Problems of professional education in the field of landscape architecture and educational work with visitors to historical gardens and parks during restoration work” (2020), International conferences 13th International Conference on Design Principles & Practices (2019) and 13th International Conference EDULearn2021 (2021).

The provisions of the dissertation were used by the author in the development and modernization of work programs and methodological materials of educational disciplines and practices of the degree education courses “Environmental Design” of St. Petersburg State University:

- work programs of the bachelor's degree course “Environmental Design” of St. Petersburg State University: “Introduction to the specialty”, “Design-projecting”, Industrial practice (measurement), Preparation of the final diploma project;
- work programs of master's degree course “Environmental Design” of St. Petersburg State University: “Theory and practice of design,” Industrial practice (design), Educational practice (research work), “Preparation of a scientific and creative project.”
- organization of educational and methodological work of the team of the main educational program “Environmental Design” and the “Museum and Architectural Clinic of St. Petersburg State University” (Appendix 2).

Certain provisions of the dissertation were developed and implemented during the work on the project “Benois Dacha in Peterhof – Art Residence of St. Petersburg State University,” the development of which has been integrated into the educational process of the “Environmental Design” program of St. Petersburg State University since 2010. The results obtained were used in other projects of the educational program.

Publications based on research results include 26 works, including a chapter in a monograph and 7 articles in scientific publications, indexed in international scientometric databases and/or recommended by the expert council of the Higher Attestation Commission of the Russian Federation with a total volume of 6.1 P. (author's contribution – 5.5 P.):

1. Petrashen, E.P. Modeling the content and conceptual apparatus of the subject area "environmental design" as an object of study in the educational process / E.P. Petrashen // Art education and science. – 2022. – No. 3 (32). – P. 66-76.
2. Petrashen, E.P. Logical-semantic model of professional competence of an environmental designer and the concept of the "wheel of competencies" of the creative team / E.P. Petrashen // Architect: news from universities. – 2022. – No. 4 (80). – Access mode: http://archvuz.ru/2022_4/33/ (date of access: 07.25.2023)
3. Petrashen, E.P.; Speranskaya V.S.; Kuzmina, A.O. Destructive landscapes in the context of urban public space. Problems of rehabilitation, adaptation and integration / E.P. Petrashen, V.S. Speranskaya, A.O. Kuzmina // Bulletin of St. Petersburg State University. Art history. – 2018. – T. 8. – No. 4. – P. 693-714.
4. Petrashen, E.P. Formation of a model of a creative educational environment using the "Black Box" and "Compensatory Homeostat" methods / E.P. Petrashen // News of the Russian State Pedagogical University named after. A.I. Herzen. – 2022. – No. 203. – P. 228-240.
5. Petrashen, E.P. Facets of professional competence of an environmental designer: uniqueness and versatility / E.P. Petrashen // Academic bulletin UralNIIproekt RAASN. – 2023. – No. 1 (56). – P. 94-98. - Access mode:https://academvestnik.ru/wp-content/uploads/2023/03/16_av1-202356.pdf (access date: 04/01/2023)
6. Petrashen, E.P. The concept of a personality-oriented model for training environmental designers at St. Petersburg State University / E.P. Petrashen //Architecture and construction of Russia. – 2020. – No. 2. – P. 46-49.
7. Petrashen, E.P. Methods of teaching landscape design to general environmental designers at St. Petersburg State University / E.P. Petrashen // Philosophy of Education. – 2017. – No. 1 (70). – P. 97-108.

The structure of the research includes introduction, three chapters, conclusion, bibliography and two appendixes. The materials of the work are presented on 233 pages. The bibliography list includes 199 items.

Appendix 1 on 39 pages contains illustrative material and tables for the chapters.

Appendix 2 on 11 pages contains annotation of the Creative environment methodology developed for the practical trainees of the Museum-architectural clinic of SPbU.

Chapter 1. FORMATION OF THE THEORETICAL BASIS OF THE SYNTHETIC CONCEPT OF ENVIRONMENT DESIGN

Chapter 1 is devoted to clarifying the theoretical basis and categorical-conceptual apparatus of the subject area of environmental design, namely: justification and modeling of the synthetic concept of the content of environmental design, development of a model and description of its categorical-conceptual apparatus, in order to clarify the role of environmental design in the system of types of creative activities and research related to the tasks of shaping the human environment, as well as the study and modeling of aspects of goal setting and design boundaries in environmental design[9].

1.1. Model of the content of environmental design based on a synthesis of fundamental theoretical concepts in the field of design

Environment design is one of the youngest areas of design activity, so its theoretical basis is still not fully formed. Its essence and content, as well as its core values, are interpreted differently by researchers.

The variety of approaches and concepts of environmental design makes it difficult to form a holistic idea of its content and role. In addition, environmental design is so closely related to other types of design activities that it is not always possible to distinguish between their spheres of responsibility and influence, and attempts at such a distinction often cause disputes and even conflicts. A system that represents aspects of environmental design with sufficient completeness, in a compact and easy-to-understand form, could not be found in the studied sources, which determines the scientific problem of this stage of the study.

The objective of the study is to study the basic concepts of environmental design and develop a system of models of the theoretical and value foundations of environmental design, reflecting the role of design in the formation of the subject-spatial environment

[9] Petrashen E.P. Modeling the content and conceptual apparatus of the subject area “environmental design” as an object of study in the educational process // Art education and science. 2022. No. 3 (32). pp. 66-76.

In the course of the study, a number of sources were studied, which to varying degrees touch on the issues of interpreting the essence of environmental design and allowing us to identify the main trends in the formation of the subject area of this type of art at the present stage. The principle of selecting sources in the study was to identify the diversity of concepts and ways of developing special areas of environmental design or offering a generalized idea of its content and values. The selection criterion was the relevance of the sources in terms of their presentation of characteristic areas of research and design tasks in the field of environmental design, and the potential for their consideration in the context of the research hypothesis. Among the sources there are both "design" and "architectural" ones, due to the close genetic connection of these arts.

There are several design concepts, such as functional, artistic, sociological, commercial, environmental and others, as well as a number of principles, including anthroponomy, adequacy, relevance, reasonableness and innovation, which are indicated by a number of researchers as fundamental to design[10] and which are fully relevant to environmental design.

Problems of aesthetics have been identified as the predominant areas of research[11], theoretical and social[12] directions of environmental design. The historical conditions of their emergence and the evolution of basic concepts, depending on the needs of society and changing social formations, are also considered as the main problem areas of architecture and environmental design.[13]. Interdisciplinary concepts of architecture and design are also current trends[14], the influence of marketing technologies and the information environment on the ideology of design[15], the relationship between individual

[10] Malin A.G., Ushkina I.M., Gurko I.S. Theory and methodology of design: lecture notes for students of the specialties "Volume Design", "Design of Subject-Spatial Environment", "Communicative Design". Vitebsk: OU VSTU, 2015. 80 p.

[11] Genisaretsky O.I. Methodological and humanitarian-artistic problems of design: abstract. dis. ... Doctor of Art History: 17.00.06. M., 1990. 36 p.

[12] Rappaport A.G. Environment and architecture // Urban environment: problems of existence: collection. Art. M.: VNIITAG, 1990. P. 157–178.

[13] Design: basic principles, types of design, features of design design, masters and theorists: illustrated dictionary-reference book: textbook / Under the general. ed. G.B. Minervina and V.T. Shimko. – M.: Architecture-S, 2004. – 283 p.

[14] Mironenko, V.P.; Vergunova, N.S. Interdisciplinary concepts preceding the symbiotic transformation of architecture and design: a historiographical aspect / V.P. Mironenko, N.S. Vergunova // The Caucasus economic and social analysis journal. – 2018. – Vol. 20. – No. 5. – P. 17-21.

[15] Cheburashkin K.N., Cheburashkina E.A. Paradigm change of Vitruvius' triad in the context of the ideology of consumer society // Material – technology – form as a universal triad in design, architecture, fine and decorative

categories and concepts of the subject area of architecture and environmental design, and their meaning. For example, the following are considered separately: the concept of function in the context of the theory of architecture and design[16], relationship between function and form, problems of understanding architectural form. An important place in a number of scientific works is occupied by the problems of humanization of space, design and technological synthesis of science and art for life-building and the time aspect of ensemble formation, as well as the construction of systems and models in the theory of architecture[17].

Among the English-language sources, such special areas of environmental design as environmental[18] and therapeutic[19], design of creative educational environment[20] and environment design for sustainable development in general, including in the context of educational activities[21]. Thus, we can say that some researchers focus more on the functional capabilities and ethical aspects in the sphere of achieving sustainable development goals and solving pressing socially significant problems by means of environmental design, while other scientists attach greater importance to historical and philosophical, especially artistic ones. aesthetic and cultural aspects of the development of this direction.

The problem of forming the theoretical foundations of architectural and design education is considered as a domestic one[22], and foreign[23] authors. A special place among such studies is occupied by examples of comparative analysis and interpretation of the

arts: materials of the international scientific conference (May 18, 2018) M.: MGHPA im. S.G. Stroganova, 2018. pp. 374–376.

[16] Rappaport A.G. Environment and architecture // Urban environment: problems of existence: collection. Art. M.: VNIITAG, 1990. P. 157–178.

[17] Zhuikov S.S. Seven elements of an architectural system // Architecton. News of universities: online scientific and theoretical journal. – 2015. – No. 3 (51). URL: https://old.archvuz.ru/PDF/%23%2051%20PDF/ArchPHE%2351pp44-55Zhuikov.pdf (access date: 04/02/2022)

[18] Lewis H., Gertsakis J., Grant, T. et al. Design + Environment: a Global Guide to Designing Greener Goods. London: Routledge, 2001. 200 p.

[19] Geist V. Life Strategies, Human Evolution, Environmental Design: toward a Biological Theory of Health. New York: Springer Science & Business Media, 2013. 495 p.

[20] Garcês S., Pocinho M., Viseu J.N. et al. The Impact of the Creative Environment on the Creative Person, Process, and Product // Psychological Assessment. 2016. Vol. 15. № 2. P. 169-176.

[21] Deniz D. Sustainable Thinking and Environmental Awareness through Design Education // Procedia Environmental Sciences. 2016. Vol. 34. P. 70-79.

[22] Shimko V.T. Architectural and design design. Fundamentals of theory (environmental approach): textbook. 2nd ed., add. and corrected. M.: Architecture-S, 2009. 408 p.

[23] Rapoport A. History and Precedent in Environmental Design. NY: Springer Science & Business Media, 2013. 540 p.

“Vitruvius triad” and the “design triad”[24], including in the field of landscape architecture[25]. It is believed that the “Vitruvius triad” can serve as a universal algorithm for analyzing various phenomena, not only architecture. At the same time, when applying it, there is a noticeable tendency towards a rather narrow understanding of the basic categories of the formula in most studies, insufficient attention to the principles of interaction of the basic categories and their connection with other concepts of the subject area.

The hypothesis of this stage of the study assumes that the content of environment design, its main values, concepts and categories can be presented in the form of a categorical model based on the combination of the “Vitruvius triad” and the “sustainable development triad”, reflecting the two prevailing directions of environmental design, the combination of which will reveal interdisciplinary synthesis as the essence of environmental design, determining its content and role, in the context of interaction between science and art[26].

The resulting model will make it possible to clarify scientific ideas about environmental design and move on at the next stage of research to the formation and description of the conceptual apparatus of the subject area of environmental design, which is necessary for the further formation of a holistic understanding of the problems of environmental design and the professional competence of an environmental designer.

As a basic scientific and methodological approach, a categorical-systemic methodology was chosen as the most productive for identifying the nature of a phenomenon. Its task is to construct scientifically based models and definitions of the main categories and concepts of the phenomenon under study, identifying its essence[27]. The advantages of this methodology include the potential to create a system of interconnected models, which facilitates their understanding and perception. The only

[24] Vlasov V.G. Historicism of architecture and Vitruvius’ triad as a metaphor for design // Architecton. News of universities: online scientific and theoretical journal. 2014. No. 2 (46). pp. 5–19.
[25] Bazilevich A.M. Benefit, strength, beauty in landscape architecture // Issues of modern technical sciences: a fresh look and new solutions: a collection of scientific papers based on the results of the international scientific and practical conference. Ekaterinburg, 2015. Issue. 2. pp. 56-58.
[26] Petrashen E.P. Modeling the content and conceptual apparatus of the subject area “environmental design” as an object of study in the educational process // Art education and science. 2022. No. 3 (32). pp. 66-76.
[27] Boush G.D., Razumov V.I. Methodology of scientific research (in candidate and doctoral dissertations). M.: Infra-M, 2020. 227 p.

disadvantage we can note is that it is little known in the field of design at this stage, which can cause difficulties during the first experience of studying the results based on it.

In this study, the categorical-symbolic method “Hexagram” is used. The principle of triadism, which underlies it, allows us to implement the idea proposed in the hypothesis of combining the “Vitruvius triad” and the “sustainable development triad” in a single model to create a basic categorical model of content and a value basis for environment design.

The “Hexagram” method allows to build a model of an object based on the identified contradiction between two elements of the system, representing a certain active action and a force opposing it or limiting it, in the form of intersecting ascending and descending triangles, each of which corresponds to a triadic description of one of the elements. Studying an object using this method allows not only to present the object as a combination of two opposing forces, but also to explore various aspects of the object through the components of these key elements as a single system. Establishing a balance between the identified opposing aspects, its controllability and efficiency, determine the nature of managing the functioning and development of an object (Fig. 1.).

The presence of a basic contradiction in ideas about environmental design was revealed during the analysis of the literature, using the example of differences in the approaches and priorities of different environmental design researchers. The meaning of the contradiction is that the creative act of architectural and design activity, a priority for some researchers, within the framework of the concept of sustainable development receives many restrictions that are a priority for other researchers. The restrictions are due to the need to reduce the anthropogenic impact on the environment within the framework of the construction processes, production and disposal of materials and components for creating an anthropogenic artificial environment, as well as other forms of impact of objects on ecosystems and socio-economic processes.

In the context of this observation, the model of the value basis and content of the subject area of environmental design, built using the categorical-symbolic method “Hexagram”, is based on two fundamental triads reflecting the identified approaches. The first triad, forming the ascending or “active” triangle in the diagram, is known as the

“formula of architecture” or “Vitruvius’ triad”: “Strength – Use – Beauty”. She describes the essence of architectural design as a formula for balancing these qualities in construction. It is worth mentioning that in Russian studies, the first place in the triad is often occupied by the “Benefit” category, while in the original the triad sounds like “Firmitas – Utilitas – Venustas”, where benefit is in second place. This reversal of categories, its reasons, potential and significance deserve separate study. At this stage, the order of the categories is preserved in accordance with the original version of the triad.

The second triad, forming a downward triangle, symbolizes the restraining principle in the system. In our model, it expresses the essence of the Concept of Sustainable Development, as a formula for balancing the importance of social, economic and environmental factors in all types of social activities (Fig. 2).

The vertices of two intersecting triangles, when connected by additional lines or vectors, can be analyzed as directions of interaction between the individual elements of the two triads. They identify additional pairs of internal contradictions that can be resolved in environmental design, requiring comprehension both in the process of design and theoretical research, and in the process of developing professional competence during training. Achieving balance for each pair of opposing qualities ensures the harmony of the system and determines the content and role of environmental design.

The study of the interaction of the elements of the two triads in the resulting model allows us to conclude that the specificity of the content of environmental design is determined by the peculiarities of the interpretation of the elements of the architectural formula in the context of the restraining influence of the concept of sustainable development, based on the idea of the need to achieve a balance of the system as a whole. The vectors that arise between the vertices of the original and new triads that arise within the framework of the hexagram model are considered as directions of interaction. The role of the central axis of development of the system is assumed by a vertically located vector that determines the mutual influence of a person’s ideas about the category “Beauty”, expressed by the top of the “Vitruvius triad”, and about the “Ecological sphere” of the “sustainable development triad”. This axis can be called defining for the worldview of the environmental designer. Additional vertical axes are the contradictions that arise

between the “Benefit” category of the “Vitruvius triad” and the “Social sphere” of the “sustainable development triad”, as well as the “Strength” category and the “Economic sphere”. Balancing horizontal axes of the system arise between these two pairs of categories. The emerging new triads demonstrate the possibilities of interpreting the category “Beauty”, in the context of the aspects of the “Social” and “Economic sphere”, as well as the relationship to the “Ecological sphere” or “Nature”, in the context of understanding “Benefit” and “Strength” in the architectural triad. Also, “Benefit” is perceived in the context of the “Social” and “Ecological” spheres, and “Strength” – in the context of the “Ecological” and “Economic” spheres. Diagonal semantic axes connect the categories of “Benefit” and “Economic Sphere,” “Strength” and “Social Sphere,” demonstrating the importance of maintaining a balance between them.

Thus, on the basis of bibliographic research, using the categorical-symbolic method “Hexagram”, a conceptual model of the content of environmental design as an interdisciplinary art form has been developed, including the basic categories of its subject area and the determining role of environmental design as a means of achieving a balance of creativity and sustainability of the environment , thereby defining the synthetic nature of environmental design and its connection with the theory of convergence of science and art, which allows us to expand scientific ideas about the role and prospects for the development of environmental design as a type of activity, its content and the tasks of developing professional competence in environmental design.

The contribution to the development of the theory is determined by the development of a new interpretation of the relationship between the universal formula “Vitruvius’ triad” and the “triad of sustainable development” using the “Hexagram” method, which made it possible to quite fully and accurately reflect the meaning and content of environmental design as an art form.

Based on the developed model, the following definition was obtained: “Environmental design is an interdisciplinary research, design and creative activity aimed at creating architectural and spatial conditions for human life and society based on maintaining a balance of mutual influences of the sociocultural, economic and environmental spheres.”

The resulting complex of contradictions and interdependencies in environmental design has no identified analogues, despite the fact that it is based on the well-known basic triads of two concepts, first included by the author in a single model. Its advantage over other forms of representing the essence of environmental design is that the complex includes fundamental categories that remain unchanged regardless of the specific field of design in which environmental design is implemented as a methodological approach. The resulting model will allow, at the next stage of research, to move on to the formation of the structure and description of the conceptual apparatus of the subject area of environmental design, necessary for the development of environmental design methodology and ideas about the professional competence of an environmental designer.

The contribution to the development of the methodology lies in the fact that the proposed model of the content of environmental design allows us to unambiguously identify environmental design and consider it as a special interdisciplinary art form that has its own methodology, which can be implemented within the framework of research and design activities, as well as professional training in the higher education system. education.

The contribution to the development of practice is determined by the fact that the resulting complex of contradictions and interdependencies in environmental design can be used in design activities to generate and test design ideas, since sustainable development goals and contradictions on the way to achieving them often become sources of inspiration for design. For each specific project, triads can be formed from more narrow concepts than in the basic model, depending on the key tasks and obstacles facing the designer and the project.

In the next section of the dissertation, a study will be carried out to develop a conceptual model of the conceptual apparatus of the subject area of environmental design and the definition of a method for achieving balance in environmental design, based on the result obtained in the current section of the dissertation.

1.2. Categorical-conceptual apparatus of the subject area of environment design

At the previous stage of the study, on the theoretical basis of a review bibliographic study, a model of the content of environmental design was developed based on the combination of the “Vitruvius triad” and the “sustainable development triad”. In the current section of the dissertation, based on the same theoretical base with some additions, the conceptual apparatus of the subject area of environmental design will be developed as the second element of the system of categorical models that form the theoretical basis of the synthetic concept of environmental design.

The conceptual apparatus of the subject area of environmental design largely coincides and intersects with other types of design, architecture, landscape architecture, urban planning and other areas of design. This situation encourages us to explore the boundaries between related activities, their specific features, priorities and methodologies that determine the existing division between them, despite the close connection. In connection with the recognition of the importance of creating a comfortable environment at the level of federal, national and priority projects for the strategic development of the Russian Federation, the issue of developing a conceptual apparatus for environmental design as an art and area of personnel training is of particular relevance.

The variety of aspects and activities in environmental design complicates the process of forming a professional standard for an environmental designer, requirements for concepts, projects and research in this area, as well as introducing students to the specialty, due to the complexity of perception and contradictory information about environmental design.

The objective of the study is to clarify and systematize ideas about environmental design as a subject area, through the development of a categorical model of the conceptual apparatus of the environmental design subject area, reflecting its interdisciplinary connections and hierarchical structure.

When studying the specifics of one direction from a group of related specialties, it is necessary to take into account, on the one hand, the categories common to the group, and on the other, the key priorities for this direction and interdisciplinary connections that

determine the place and role of the specialty in the “family” of related professions. Considering the “primacy” of architecture in the emergence of the entire “family” of related professions in the field of design, the formation of the conceptual apparatus of the subject area of environmental design cannot avoid references to related studies, which determines the presence of both “architectural” and “design” sources in the work.

“The systematic approach inherent in design methodology involves a comprehensive, multi-level consideration of the design object as a set of interconnected and interdependent functional and sociocultural components”[28]. As a result of bibliographic research, it was revealed that the conceptual apparatus of the subject field of environmental design is incompletely presented, insufficiently developed and systematized. This systematic approach is not sufficiently expressed, as are the relationships and interdependencies of the elements.

The task of modeling the subject area of environmental design, as a special type of art, is the development of science-based design, synthesizing creative, technical and research approaches to the formation of the living environment. The associated convergent paradigm in the field of design education is becoming increasingly widespread. In addition, a number of significant studies have been carried out in the field of environmental approach in architecturaleducation. The study of theoretical principles and the famous triad of Vitruvius, for many authors, for example, such as Lebedeva G.S., Heath T., Pisei M. remains an important structural element of research in the field of environmental design. Later ideas of templates and patterns for improving design approaches from authors such as K. Alexander and N. Salingaros also arouse unconditional interest, but, as a rule, do not have the same universality as the “architecture formula,” which gives rise to controversy around them. The existing experience in the formation of conceptual models for design using the categorical-systemic methodology, including the method of two-level triadic decoding of concepts, allows us to speak about the high heuristic and productivity of this approach.

[28] Malin A.G., Ushkina I.M., Gurko I.S. Theory and methodology of design: lecture notes for students of the specialties “Volume Design”, “Design of Subject-Spatial Environment”, “Communicative Design”. Vitebsk: OU VSTU, 2015. P. 15.

The research hypothesis suggests that the determining context for the formation of the conceptual apparatus may be the conceptual model of the value basis and content of environmental design, developed at the previous stage, using the method of two-level triadic decoding of the categories of the “Vitruvius triad”, taking into account the context of the “sustainable development triad”. The advantage of this approach to model development is the unity of the triadic principle used at two stages of the study, which allows us to perceive two categorical models as a single universal system that forms a holistic synthetic idea of environmental design as an interdisciplinary art form, reflecting the relationships and interdependencies of the elements of the conceptual apparatus of the subject area environmental design, taking into account the hierarchical structure of design and research activities. The positive effect of the obtained result will be the possibility of moving on to the analysis of active environmental design factors that form the basis for the uniqueness of design solutions at the next stage of the study.

As a scientific and methodological approach, as at the previous stage, a categorical-systemic methodology was chosen as the most productive for the formation of the conceptual apparatus of the subject area of any phenomenon. The categorical-symbolic method “Two-level triadic decoding of concepts” was chosen to preserve the continuity of the principle of triadity in two models, conceived as a single system, since the principle of triadity is considered one of the most productive approaches to understanding the essential aspects of the nature of objects and phenomena. In addition, this method provides the ability to construct a hierarchical structure of the conceptual apparatus in accordance with the hierarchical nature of project development. Thus, the categorical method “Two-level triadic decoding of concepts” allows you to form a developed system of auxiliary concepts, build a hierarchy from general categories to specific concepts that turn into specific design solutions depending on the design area based on three initial categories necessary and sufficient for a generalized description of the phenomenon.

According to the method, the first level of decryption scheme uses numerical designations of categories [0], [1], [2]. In decryption level 2 triads, numerical designations of categories [00, 01, 02], [10, 11, 12], [20, 21, 22] are used. The order of choosing positions for distributing concepts along the vertices of triangles is determined by the

possibility of sequentially asking questions to them, for example: [0] – what? [1] – how? [2] – why? (Fig. 3).

The research process consisted of several experimental stages related to the desire to select the most adequate decoding for each of the basic categories, taking into account the context formed by the concept of sustainable development in the content model and the value basis of environmental design, developed using the Hexagram method. The purpose of selecting categories at the 2nd level was to attract sufficiently capacious and generalizing concepts, which, in turn, could receive an even more detailed, substantive decoding at the 3rd and even 4th level, being also presented in the form of triads that make up the hierarchical model of the conceptual apparatus of the subject area of environmental design.

The first of the categories of the "Vitruvius triad" is [0] "Strength" – Firmitas, which is traditionally understood as the strength of structures. However, in the context of the emerging conceptual apparatus of the subject area of environmental design, we cannot talk exclusively about the strength of structures, but must take into account a qualitative assessment of the processes associated with the planned scenario for using the environment. The context specified by the environmental design content model makes it possible to use another translation of the Latin term, namely "Stability", as a broader category than "Strength", meaning the ability of an object to maintain or restore certain qualities at the required level for a certain period with minimal cost time under known conditions. At the same time, the category "Sustainability" is understood as even broader, requiring the participation of all six basic categories of the conceptual model of the content of environmental design, therefore it cannot be used to determine only one of the peaks of the triad. In this case, the concept [00], which answers the question "what?", according to the method, we will present as "Architectural and spatial solutions", including at the third and fourth levels of decoding the qualitative characteristics of the design object, such as, for example: spatiality, fullness and focus[29]. The concept [01],

[29] Tolstova A.A. Environment as an object of design: definition of the concept by the method of two-level triadic decoding // Architect: news of universities. 2021. No. 2. URL: http://archvuz.ru/2021_2/16/ (access date: 01/01/2023)

which answers the question “how?”, can be defined through “Engineering and construction solutions”. These include design, energy efficiency and communication and technological characteristics. The concept [12], which answers the question “why?”, can be designated as “Operational solutions”, defining aspects of design aimed at achieving convenience, feasibility and uninterrupted use of the resulting object after its commissioning. These decisions must take into account the care needs of the facility to maintain aesthetic quality and safety, including the characteristics of the intensity or extensiveness of the care regime, as well as the maintainability of environmental elements, the economy or cost and labor intensity of operation, as well as the ergonomics of solutions as an important factor of convenience.

The category “Benefits” in domestic studies, as a rule, is considered from the point of view of the main functional purpose of the object, while studies by English-speaking authors suggest that the criterion for the quality of “usefulness” of a design is, first of all, “consumer value” and compliance sustainable development goals in terms of environmental friendliness at all stages – from the selection of materials to the conservation of biodiversity and the possibility of recycling. In this regard, “User value of environmental design” was chosen as the “cornerstone” concept of this triad [00], answering the question “what?”, which is determined by the design task and the “direction” of the space, the subjective feeling and experience of the user, both individual and collective, its emotional, psychophysical and behavioral reactions. At level 3 it can be described as having the qualities of safety, comfort and adequacy.

Element [01] “Functional value”, chosen as the next element of the second level triad, is determined by the influence of design on the effectiveness of realizing the purpose of the object. At the third level of decoding, functional value can be described as providing an economic, time or technological advantage compared to the original state or alternative offerings and analogues. “Ecosystem value” is the third, “controlling” element [02] of this triad, answering the question “why?”, determined by the ecosystem influence of the formation or development of the environment. At the third level, it can be described as the preserving (supporting), compensating or biophilic (ecosystem developing) influence of environmental design on the existing state of the ecosystem in and around

the design object, the project's approach to the tasks of environmental protection, biodiversity and the implementation of sustainable development goals in general.

The “Vitruvius triad” is crowned by the category [2] Venustas – “Beauty”. In Antiquity and in the era of “great styles” there were clear canons of beauty, however, in the modern world, according to the popular expression “beauty is in the eye of the beholder”[30], the perception of “Beauty” is largely subjective, determined by cultural background, level of education and even the age of the observer, so arguing about tastes in our time is considered unethical. This trend led to the fact that in some architectural schools, for example, in the German Bauhaus, by the end of the twentieth century, a fundamental replacement of the concept of the definition of “beautiful” with the definition of “consistently”, “logical”, “appropriate” - “consequent” was established as a criterion assessing the visual, compositional and stylistic quality of design solutions. In this regard, when deciphering this category, it is proposed to take into account the specified aspect of the conditionality of the perception of “Beauty” by the personal experience and ideals of both the author of the project and the user-observer. Thus, at the second level of decoding, “Beauty” [2] is “Embodiment” [20], “Impression” [21] and “Ideal” [22], where the category “Ideal” reflects the complex of ideas and expectations of the author, customer and target audience of the project, sometimes unconscious, based on personal stories and experience. It should be noted that ideal ideas influence both the creation of design ideas and the formation of expectations from the environment among users who gain certain experience of life in certain conditions. The influence of the concept of sustainable development, as a common value system, creates unifying guidelines for decision-making by all participants in the design process. “Embodiment” is the technical quality and craftsmanship of an object relative to modern professional standards and criteria for assessing the artistic level of the composition and execution of certain elements and their totality, and “Impression” reflects the psychologically and socially conditioned level of user satisfaction from the correspondence of the visual and emotional-sensory the

[30] “[In the original:] “Beauty is in the eye of the beholder” (Margaret Hungerford. “Molly Bon” (1878): part I, chapter 12). In a slightly different form, the expression was found before. The idea goes back to antiquity (Theocritus, Idylls, VI, 18). Quote from: Large dictionary of quotes and popular expressions. M.: Eksmo, 2011. 1215 p.

experience that he receives during the actual perception of the object, the expectations that he consciously or unconsciously had based on his age, temperament, experience and picture of the world.

Thus, based on the “Vitruvius triad”, using the “Two-level triadic decoding of concepts” method, a model of the conceptual apparatus of the subject area of environmental design has been developed, reflecting its hierarchical structure, revealing the essence of the categories “strength”, “benefit”, “beauty”, taking into account specifics of environmental design using clarifying triads of concepts such as architectural and spatial solutions, operational and engineering solutions, consumer, functional and environmental value, embodiment, perception and ideal, which allows you to describe the subject area with the necessary degree of completeness and identify its interdisciplinary connections maintaining the universality of application of the model for various areas of design at three levels of deciphering key categories in the context of sustainable development goals and the paradigm of convergence of science and art (Fig. 4).

The positive effect of the result is determined by the possibility of moving on to the analysis of environmental design parameters that form the basis of its subjective perception at the next stage of the study.

The contribution of the result to the theory is that in the course of applying the method of two-level triadic decoding, in addition to the basic categories of the “Vitruvius Triad”, nine concepts of the second level were obtained, revealing their nature. At the third level, twenty-seven interrelated concepts already arise. Based on the model of the conceptual apparatus of the subject area of environmental design, we can conclude that the method of achieving a balance of mutual influences of the sociocultural, economic and environmental spheres in the process of forming architectural and spatial conditions for human life and society in environmental design is the choice of means to ensure the stability of architectural and spatial , engineering, construction and operational solutions during the life cycle of an object, in the context of requirements for the consumer, functional and environmental value of the created environment, for the material embodiment of a creative idea capable of producing an impression that corresponds to

the figurative and aesthetic ideals and expectations of society or a specific customer as a user environment.

The resulting model allows us to develop the conceptual apparatus of the subject area of environmental design, comprehensively and systematically identifying the relationships and interdependencies of its elements. It can be developed through further detailing using additional levels of decoding or using the category mutation method to identify new relationships between aspects and elements, including as part of a training methodology in the field of environmental design, which determines the contribution of the result to the methodology.

In addition, the model can be used for planning and analysis of projects, in order to identify the completeness of the elaboration of all the necessary elements of the interdisciplinary complex of environmental design aspects included in the model, which determines its contribution to the practice of environmental design.

In the next two sections of the dissertation, the obtained result will be used as a theoretical basis for considering the compliance of active factors or environmental parameters with the ideals and expectations of society or a specific customer as a user of the environment, in the context of identifying contradictions in ideas about the comfort of the environment, taking into account the communicative potential of environmental design, from the point of view of creativity theory.

1.3. Contradictions in the criteria for assessing environmental comfort and communication aspects of environmental design

Environmental design represents the most human-centric approach to design[31], therefore, in addition to the global tasks of achieving sustainable development goals, the focus of his attention is on the subjective aspects of the perception of the environment and aspects of the impact of the environment on humans. An important principle of human interaction with the environment is the need for alternation of opposite states, which

[31] Tolstova A.A. Consumer qualities of the environment from the point of view of design: information model // Design. Materials. Technology. 2021. No. 1 (61). pp. 43-49.

received scientific justification in the “perspective-refuge theory” described by J. Appleton[32]. This theory, together with a number of others[33], largely explains the existing problem of the emergence of discrepancies and conflicts in the interpretation of the concept of “comfortable environment” in real projects, which complicate the implementation of the “Comfortable Environment” program.

The main scientific problem, in the context of the above, can be called the inconsistency of ideas about environmental comfort, in particular, about the main criteria of comfort and methods for their assessment beyond the measured hygienic, ergonomic and climatic indicators, which prevents goal setting and evaluation of solutions in environmental design, although they are not always fully taken into account in projects of the Comfortable Environment program.

In this regard, the task of this stage of the study is to identify the active qualities of comfort and acceptable relationships between the opposing factors included in them, the choice of balance between which determines the goal setting and design boundaries in the design of a comfortable environment.

Modern human sciences are actively studying various aspects of comfort, while the main qualities usually include environmental, social and urban comfort[34]. The research presents the experience of mathematical modeling of environmental comfort, taking into account its multifactorial nature.[35]. Comfort diagnostics are also carried out based on the concept of territorial marketing[36]. Unfortunately, practical design often turns out to be divorced from current scientific data from cognitive science, neurobiology, and behavior science, which expand the understanding of the influence of the environment on humans, and also create the prerequisites for taking into account not only comfort factors, but also

[32] Appleton, J. The Experience of Landscape. New York, John Wiley and Sons, 1975. URL: https://scenicsolutions.world/theory-of-landscape-aesthetics/#appleton (date of access: 25.03.2023).

[33] Landscape theory [site] /Scenic Solutions. The science of scenery.
URL: https://scenicsolutions.world/theory-of-landscape-aesthetics/ (date of access: 03/25/2023)

[34] Ugryumova A.A., Pautova L.E., Pautova E.P. Comfort as a factor in the sustainable development of the urban environment // Russia: trends and development prospects. 2018. Vol. 13. Part 2. pp. 245-251.

[35] Sokolskaya E.V. Multifactor model as a basis for managing the environmental quality of urban areas // Theoretical and Applied Ecology. 2018. No. 2. P. 26-34.

[36] Polyakova N.V., Zaleshin V.E., Polyakov V.V. Diagnostics of the comfort of the living environment in cities: justification and formation of the methodology // News of BSU. 2020. T. 30. No. 1. P. 121-129.

creativity factors[37] when planning active environmental qualities[38]. At the same time, in Russian architectural and environmental science there is almost no practice of "post-occupancy assessment" or "post-assessment" of objects, which has become quite widespread in the USA[39] and a number of other countries[40], which allows you to take into account the empirical experience of implemented projects in the development of design. All these reasons require increased attention to the subjective factors of environmental comfort and intensified research in this area for the successful formation of a comfortable living environment in Russia.

The hypothesis of this stage of the study is the assumption of the possibility of identifying and taking into account the contradictions accompanying projects for creating a "comfortable environment" at the stage of pre-project analysis, to clarify design goals, comfort boundaries, as well as when assessing design results, using a system-categorical approach, for visualization and systematization of the relationships between subjectively significant, opposite, but not mutually exclusive parameters of environmental comfort.

The theoretical basis of the study was the theory of "prospect and refuge"[41], creativity theory[42], as well as studies devoted to environmental comfort criteria[43].

Research methods include the categorical-symbolic methods "Black Box" and "Celtic Cross".

[37] Barysheva T.A. Psychology of creativity development: theory, diagnostics, technology. St. Petersburg: VVM Publishing House LLC, 2016. 316 p.

[38] Ergan S. Quantifying human experience in architectural spaces with integrated virtual reality and body sensor networks // Journal of Computing in Civil Engineering. – 2019. – Vol. 33. – № 2. – URL: https://www.researchgate.net/profile/Zhengbo-Zou/publication/329844839_Quantifying_Human_Experience_in_Architectural_Spaces_with_Integrated_Virtual_Reality_and_Body_Sensor_Networks/links/5c63454f92851c48a9cfb702/Quantifying-Human-Experience-in-Architectural-Spaces-with-Integrated-Virtual-Reality-and-Body-Sensor-Networks.pdf (date of access: 15.09.2022)

[39] Othman A.A.E., Elsaay H. A learning-based framework adopting post occupancy evaluation for improving the performance of architectural design firms // Journal of Engineering, Design and Technology. 2018. Vol. 16. № 3. P. 418-438.

[40] Hay R. et al. Post-occupancy evaluation in architecture: experiences and perspectives from UK practice // Building Research & Information. 2018. Vol. 46. № 6. P. 698-710.

[41] Landscape theory [site] / Scenic Solutions. The science of scenery. – URL: https://scenicsolutions.world/theory-of-landscape-aesthetics/ (date of access: 08.08.2023).

[42] Rhodes, M. An analysis of creativity // The Phi delta kappan. 1961. Vol. 42. № 7. P. 305-310.

[43] Ugryumova A.A., Pautova L.E., Pautova E.P. Comfort as a factor in the sustainable development of the urban environment // Russia: trends and development prospects. 2018. Vol. 13. Part 2. pp. 245-251.

The “Black Box” method (Fig. 5) is used to plan and determine the result of the subject’s interaction with the environment, as one of the key stages of analysis in environmental design.

The “Celtic Cross” method allows you to identify pairs of contradictions at two levels of concept analysis. Moreover, in each of the resulting pairs of contradictions, one of the concepts is defined as the “minimum”, and the other as the “maximum” of a certain range. This principle of organizing the model allows us to interpret each pair of opposed concepts as the boundaries of a certain range, within which there are intermediate states of qualities. At the same time, it can be assumed that the maximum quality must necessarily contain in its composition the quality that is indicated as minimal or basic, but it is complemented by properties of the opposite nature to the extent that allows the basic quality to be preserved to a fairly significant extent (Fig. 6).

This method was chosen to analyze the active qualities of the environment, taking into account the possibility of comparing models based on it and the “DISK Model of Behavioral Types” (Fig. 7), due to the similar four-beam structure and the principle of opposite directions of the model, which is advisable for the formation of a comfortable environment, taking into account various behavioral types of people[44].

Using the “Black Box” method, types of environments are identified that are opposite in terms of the result of the interaction of the subject (Person) with the environment: 1 – isolation from society in a personalized environment or integration with society in a public universal environment, 2 – pleasure from the convenience of the environment or expansion of experience and opportunities as a result of adaptation and interaction with the environment (Fig. 8).

Then, the concept of “environment design” is considered using the “Celtic cross” method as a system of two pairs of contradictions that involve making a first-level choice: a personal (unique) environment or a general or public (universal) environment; comfortable environment or developmental environment. At the same time, the

[44] Tolmacheva I.A., Kozlov D.A. Relevance of William Marston's DISC model for Russian business and business training / Report at the 11th Conference of the St. Petersburg Club of Consultants and Trainers. URL: http://fortem–center.ru/files/002/541/019/2541019/original/Technical–report–DISC.pdf (access date: 01/01/2023)

“minimum” value is assigned to the quality of the environment, which requires minimal effort for adaptation on the part of the Person, and the “maximum” value is assigned to the quality of the environment, which requires greater adaptive effort. The four quadrants formed by the axes of the model allow us to consider four synthesized types of environment: I comfortable general and II comfortable personal, III developing personal and IV developing general.

Further, for each quality, contradictions of the second order are identified, expressed through a minimum and a maximum from the point of view of the need for the efforts of professionals to create such an environment. Thus, a personal environment can be everyday or vernacular, created by the subject of the environment or the Person independently, without the help of a designer, or designer, formed by professionals on behalf of the Person, in accordance with its needs. The general environment in terms of complexity can be architectural or nature-like, where a large number of different specialists and users take part in the formation and operation of the environment. A comfortable environment can meet minimal social and everyday needs or maximum cultural needs; a developing environment can be, at a minimum, interactive or creative, at a maximum. (Fig. 9)

“The Model of Behavioral Types of the DISK Methodology” examines four behavioral types, which are characterized by active or reactive behavior, as well as the perception of the world as friendly or hostile, in different combinations. D – dominant (active behavior in a hostile world), I – influencing (active in a friendly world), S – stable (reactive in a friendly world) and C – controlling (reactive in a hostile world). Depending on personal life experience and circumstances, a person of any type can master related types of behavior, while the ability to adapt and choose a behavioral strategy is a sign of a more developed, and therefore more successful, personality. In this regard, it seems useful to distinguish between a comfortable and developmental environment, taking into account the presence of different behavioral types of users and the possibility of them choosing different behavioral strategies. To do this, it is necessary to consider in more detail the parameters that determine the perception of the environment as comfortable or developmental and set the corresponding design goals in environment design.

The second model, also developed using the “Celtic Cross” method, considers comfort factors, taking into account their internal contradictions (Fig. 10).

A contradiction of the first level is present between the factors of ecological and urban comfort, since the first implies the maximum approximation of the environment to the natural ecosystem, and the second - maximum convenience provided by modern technologies. Social comfort, by default, also implies cultural comfort, however, cultural needs do not coincide among different demographic, social and national groups of the population, therefore it is proposed to separate social comfort and cultural comfort, which is proposed to be added to the three standard criteria, as a parameter, opposed to social comfort in homeostatic balance. Next, within each factor, contradictions of the second level are considered. Minimum environmental comfort can be ensured by the absence of hazards or their minimum values, and the maximum by the salutogenic impact of the natural or nature-like environment. Urban comfort is divided into a “minimum”, expressed by the provision of basic household needs, and a maximum, associated with the exercise of freedom of choice. The social factor ranges from ensuring security (minimum) to ensuring a prestigious lifestyle (maximum), cultural comfort - from the acceptability of a universal cultural code (minimum) to meeting the requirements of the uniqueness of the cultural environment (maximum). The four quadrants formed by the axes of the model allow us to consider four types of comfortable environment: I – cultural-ecological and II – socio-ecological, III – socio-urban and IV – cultural-urban (Fig. 10).

According to the model, the cause of conflict when choosing a design strategy and behavior may be differences in the understanding of priorities in the formation of the environment. Using an analogy with the DISC model, we can clarify that at this stage of development of environmental knowledge, the urban environment is assessed as hostile to humans, and the ecological environment as favorable. Therefore, a modern comfortable urban environment must preserve (reactively) or restore (actively) natural components, making them an integral part of culture and social security, as well as the realization of freedom of choice. At the same time, part of society has the opposite idea of this issue, which sometimes leads to their perception of the natural environment as hostile or developmental, rather than favorable and comfortable.

The third model in the system of models developed using the “Celtic Cross” method is built on the study of the parameters of expression of the “4Ps” of creativity, factors that shape the creative environment[45], according to creativity theory[46].

At the same time, the maximum expression of the developmental environment as a creative environment depends on the presence of a material “Product” as a result of the interaction of the “Person” and the environment, since in its absence, the environment is classified as developmental, therapeutic, interactive, gaming or educational, but not as creative.

In our model, a “Person” can be a “Spectator” who does not create a material product (minimum), or be a “Doer” who forms or participates in the formation of a “Product” (maximum), thus the environment can be both developmental for some and creative for other “Persons”. The “process” of the emergence of a “Product” can be spontaneous (minimum) or organized (maximum), or combine and alternate these two states. The very environment in which the “Process” occurs, in the terminology of the “4P” theory of creativity, is designated by the term “Press”, which in our model is considered as a transformable or interactive (minimum) or harmonious (maximum) space, which also affects the possibility of the emergence or the specifics of the “Product”. “Product” in material form (maximum) is the embodiment of a creative idea, as a result of the influence of the environment and process, and in intangible, minimal expression, the product of the developing environment can be the emotions of “Persons”, their experience, new skills, relationships, impressions , motivation, increasing one’s own creativity, etc., which, of course, accompany the emergence of a creative material “Product” in a creative environment. The quadrants in this model can be considered in the context of the predominant influence of one or another of the “4Ps” in certain conditions (Fig. 11).

Thus, using modeling using the “Celtic Cross” method, a system of conceptual models was obtained that allows us to visualize the boundaries of the expression of the

[45] Gruszka A., Tang M. The 4P’s creativity model and its application in different fields // Handbook of the management of creativity and innovation: Theory and practice. 2017. P. 51-71.

[46] Rhodes, M. An analysis of creativity // The Phi delta kappan. 1961. Vol. 42. № 7. P. 305-310.

parameters of a comfortable living environment, taking into account the human need to implement various behavioral scenarios, both active and reactive, taking into account the need for alternating factors comfort and creativity.

The proposed system of models allows us to group, identify the levels and range of expression of parameters of comfort and creativity of the environment, which allows us to clarify ideas about the criteria for the comfort of the environment and the presence of a range of degrees of expression for them.

The obtained result can be used at the next stage of the study to form a matrix of parameters of comfort and creativity of the environment, allowing one to determine or select their relationships.

The contribution to the development of the theory lies in the expansion of scientific ideas about the criteria for the comfort of the environment, thanks to the involvement of concepts from the theory of creativity and behavioral psychology.

The scientific novelty consists in clarifying the criteria for the comfort of the environment by identifying their internal contradictions, introducing the parameters of creativity and personalization as factors of uniqueness and universality, taking into account the minimum or maximum degree of expression, as a manifestation of the communicative aspect.

The advantage of the proposed models is the visualization of opposing qualities and factors, and the ranges of their possible expression, which makes it possible to take into account their interaction when setting projection goals in environmental design.

In the future, the proposed system of models will serve to develop tools for analyzing and designing the parameters of comfort and creativity of the environment and substantiating aspects of the formation of professional competence of environmental designers.

The contribution to the development of the methodology is to develop a framework for improving the processes of analysis and goal setting in environmental design, which can be used in conjunction with the methods of mind maps and design thinking.

The contribution to the development of practice lies in the possibility of using a system of models or its elements to solve specific design problems in terms of

determining goals and principles for choosing environmental parameters, as well as as educational material for interactive modeling of cognitive schemes and mental maps of projects.

In the next section of the dissertation, a study will be carried out to develop a matrix of comfort and creativity, combining the identified parameters for ease of use.

1.4. "Design Code Matrix" as a tool for programming design goals in environment design

At the previous stage of the study, a system of environmental design models was developed, identifying aspects of its uniqueness and versatility in terms of comfort and creativity. In the current section of the dissertation, using the matrix and tabular method[47], based on these models, a matrix will be developed that combines the obtained parameters into a single tool for goal-setting and determining the boundaries of expression of parameters of comfort and creativity of the environment.

The matrix and tabular methods were used to construct a comparison matrix and generalize the identified pairs of environmental factors into a single design analysis tool, a kind of "mixer" for the environmental designer. This method allows you to decompose, visualize and systematize a number of "subgoals" and their options, depending on the planned scenario of the subject's interaction with the environment, within the framework of the overall goal of the project – the formation of a favorable environment for life.

Currently, the parameters of environmental creativity, which have a high communicative potential, according to cognitive science and creativity theory, are practically not considered in the context of design, even within the framework of studies related to the practice of creating "creative spaces", which have become widespread and popular in the last decade in Russia.

[47] Nefedeva K.V. Infographics, data visualization in analytical activities // Proceedings of St. Petersburg State Institute of Cinematography. 2013. T. 197. pp. 89-93.

What is obviously overlooked in this regard is the fact that the dimensions of creativity provide high communication potential to ensure uniqueness in environmental design.

A creative or developmental environment is a necessary condition for creating variability in behavioral scenarios in the environment.

It can be assumed that the presence of certain general principles of alternating factors of comfort and creativity, uniqueness and universality of the environment, as parameters comparable to the theory of “prospect and refuge,” can provide the ability to select user scenarios in accordance with the behavioral types of users of the environment.

Their design in the form of a matrix of parameters of comfort and creativity, in our opinion, will create the possibility of more accurate and complete programming of environmental design parameters, determining its goals, boundaries and the degree of expression of the active qualities of the environment in the designed objects.

So, for ease of practical use when forming environmental scenarios and assessing the severity of factors, a “design code matrix” of comfort and creativity of the environment has been developed (Table 1), which allows you to select approximate values of the balance of factors for the initial and planned state of the object based on the design results, or - for its assessment “after occupancy” and the start of operation.

Understanding the relationship between the opposing parameters of comfort and creativity and the degree of their expression in environmental design will contribute to the formation of design goals and objectives for the implementation of the synthetic concept of environmental design in research work and practical design. This result, in turn, allows us to move on to the development of the communicative aspect of environmental design using the example of the mechanism of functioning of a creative environment, reflecting the result of the stimulating and developmental impact of the environment on the creative performance and competence of the user of the environment.

The resulting “design code” programming matrix for comfortable and creative environment allows us to clarify design goals in environment design by planning changes and the degree of expression of key qualities in the designed environment.

The contribution to the development of the theory lies in determining the homeostatic nature of the balance of opposing environmental parameters, which should not be interpreted as mutually exclusive, but can be provided in the environment in different proportions, depending on the characteristics of the design problem and the initial data for the design.

Scientific novelty lies in the development of a universal, visual and scientifically based tool for determining the goals of design and analysis in environmental design, in terms of the effect of the perception of the environment, in the formation of a favorable environment, taking into account the theories of comfort, creativity and behavioral typology.

The advantage of the proposed tool, in contrast to its closest analogue, the SWOT analysis method, is to increase the specificity of the decomposition of the analyzed environmental parameters, the ability to set approximate relationships between opposite, but not mutually exclusive parameters, which increases the accuracy and focus of the analysis.

In the future, the proposed system will serve to clarify ideas about the functioning of the creative environment and the formation of professional competence of environmental designers.

The contribution to the development of the methodology is the development of a new tool for improving the processes of analysis and goal setting in environmental design, which can be used in conjunction with the design thinking algorithm, as part of the stages of divergence and convergence when generating design ideas, as well as when analyzing the resulting prototypes.

The contribution to the development of practice lies in the possibility of using this tool in the practical development of design concepts, as well as in the formation of professional competence of environmental designers.

In the next chapter of the dissertation, a study will be carried out to develop a mechanism for the functioning of a creative environment, as a condition for the formation

of professional competence of an environment designer, taking into account the potential for personalization of the environment and the learning process.

Conclusions on the first chapter

1. The proposed system of categorical models allows us to visualize and summarize the main aspects of the content, value basis, conceptual apparatus, goals and specifics of environmental design, taking into account the context of theories of creativity and convergence of science and art. A system of models can serve as an effective tool for analysis and reflection of both the process and results of design, as well as the design of research and education in environment design, by identifying connections and mutual influences of various factors of the human environment, and allows us to formulate the main provisions of the synthetic concept of environmental design.

2. The role of design in the formation of the subject-spatial environment is defined as synthesizing and is achieved by a balance of the creative, transformative principle of design, as art, and preserving or supporting, taking into account the restrictions imposed on it by sociocultural, economic and environmental conditions, the requirements of the concept of sustainable development and other factors.

3. Achieving a balance of mutual influences of the sociocultural, economic and environmental spheres in the process of forming architectural and spatial conditions for human life and society in environmental design occurs through the choice of means to ensure the stability of architectural, spatial, engineering, construction and operational solutions during the life cycle of the object, in the context of the requirements to the consumer, functional and environmental value of the created environment, for the material embodiment of a creative idea, capable of producing an impression that corresponds to the figurative and aesthetic ideals and expectations of society or a specific customer as a user of the environment.

4. The key characteristics that determine the goals and boundaries of design in environment design include the subjective parameters of comfort and creativity, as well as the communicative aspects of the design of a comfortable and creative environment. It

has been determined that the balance of these factors, with the possibility of their choice and alternation, has the potential to have a positive impact on a person, contributing to the preservation of health, stimulation of cognitive activity, cognitive and creative activity, the formation and development of creativity and integrative competencies.

Chapter 2. COMMUNICATIONAL ASPECT OF CREATIVE ENVIRONMENT DESIGN AND FORMATION OF DESIGNER COMPETENCE

Chapter 2 is devoted to the development of ideas about the formation of a creative environment as an environment favorable for creativity and the development of professional competence of an environmental designer. The theoretical problem of this chapter is the study and modeling of the impact of the creative environment and clarification of the content and features of the professional competence of the environment designer. Practical problem - case studies[48] *and development of tools aimed at improving methods and improving the quality of training projects and personnel in the field of environmental design*[49] *using the creative environment effect*[50].

2.1. The phenomenon of the creative environment in the history of artist colonies and residences of artists

At the previous stage of the research, a system of models was developed that represented a synthetic concept of environmental design, in particular, a system of models of homeostatic contradictions and a "design code matrix" of comfort and creativity of the environment, allowing to build a system of goals and design boundaries in the form of a balance of environmental parameters that are opposite to each other , jointly determining the active qualities of the environment that influence the user. In the current section of the dissertation, historical examples of updating the concept of a creative environment will be considered, allowing us to identify its significance for the manifestation of creativity of the "Person" and the creation of creative "Products" that can arise as a result

[48] Petrashen E.P. Creative environment. The phenomenon of artist colonies, dachas and estates of cultural figures // Collection of articles. report All-Russian conf. "Problems of reconstruction and restoration of monuments of historical and cultural significance." St. Petersburg: St. Petersburg State University Publishing House, 2011. pp. 102-106.

[49] Petrashen E.P. Logical-semantic model of professional competence of an environmental designer and the concept of the "wheel of competencies" of the creative team // Architect: news of universities. – 2022. – No. 4 (80). URL: http://archvuz.ru/2022_4/33/ (access date: 07/25/2023)

[50] Petrashen E.P. Formation of a model of a creative educational environment using the "Black Box" and "Compensatory Homeostat" methods // Proceedings of the Russian State Pedagogical University named after. A.I. Herzen. 2022. No. 203. pp. 228-240.

of both spontaneous and purposeful creative “Process” in a special environment, characterized as “Press”.

The theoretical basis of the study is the theory of creativity, which arose in the 60s of the twentieth century, as well as the latest neuroscience data on the influence of the natural and architectural environment on cognitive and mental processes and the concept of sustainable development, as a necessary value basis for education and all types of human activity at the present stage.

The theory of dynamic information systems (TDIS) was chosen as a scientific and methodological approach, since the product of the research is a program of activities with the gradual achievement of various results, which can most successfully be presented through TDIS.

The study is based on bibliographic and empirical research methods combined with graphical modeling methods. A number of studies on the creative environment in education were analyzed, as well as sources on the “4Ps of creativity” and examples of historical and contemporary art residencies in Russia, Europe and the USA.

For the purposeful design and creation of a creative environment, we will consider examples of its spontaneous and purposeful formation recorded in the history of art. Such examples include the socio-aesthetic ideas of creating a “highly artistic living environment for people based on the synthesis of spatial arts”[51], which first appeared in the middle of the 19th century, when concepts of the role of art in the transformation of reality began to be developed, as well as the phenomenon of “artist colonies”, estates and residences of artists, which became one of the features of the turn of the 19th – 20th centuries, and then the experience of “ houses of creativity" of the Soviet period.

One of the first artists who hoped to reform society through art was W. Morris[52]. His ideas laid the foundation for the development of many areas of design, including environmental design, and indeed, had a huge impact on the material culture of our time. Morris's work took place despite the unfavorable historical context to which he contrasts

[51] Frolov V.A. Modern architecture: the problem of interaction between arts // 100 years of St. Petersburg modernism. St. Petersburg, 2000. P. 60.

[52] Makarov, K.A. Aesthetics of Morris and the fate of decorative art in Russia // Aesthetics of Morris and modernity. M., 1987. pp. 114-140.

his "Red House". In fact, this residence, created by a whole group of artists to realize Morris's vision, became for some time the center of a special common creative process and an opportunity for the development of their talents, so it can be considered as one of the first examples of a purposefully organized creative environment.

Also in the mid-19th century, “tired of political tensions, artists continued to seek an outlet in the beautiful nature of France”[53]. In the history of the formation of the Barbizon school, where the effect of the creative environment can be seen in the choice of the special setting of the Barbizon village, contrasting with Paris, the formation of a community and the general creative process based on the ideas of the development of landscape painting that inspired the creativity of its participants.

The 1880s–1890s were the time of the founding of a number of “colonies” of artists in Russia and Europe, which can also be considered through the prism of the concept of a creative environment and its productivity for revealing the creative talents of artists. Among the criteria that make it possible to determine the association of various creators in such a phenomenon as a “school”, there is a “chronotopic marker”[54]. It is this that becomes key when analyzing the conditions for the formation of a “school” from the point of view of the creative environment factor.

Artists united in Abramtsevo - adherents of new forms of art synthesis, inspired by ancient Russian and folklore images. The idea was picked up by participants in other “colonies” - in Talashkino, on the estate of the artist V. D. Polenov on the Oka River.

Associations of artists - representatives of different art styles, who “fled” from the city, prompted by romantic nostalgia for a rural idyll and simple life in nature, arose under the influence of a kind of “magic of place” or “spirit” of the area where they experienced an extraordinary creative upsurge. The result of their activities was the transformation of these previously little-known settlements into unique resorts for the artistic intelligentsia,

[53] Kabalyuk E.O. Development of new art. Political unrest in France as a catalyst for the emergence of impressionism // Innovative solutions to social, economic and technological problems of modern society. 2021. P. 96. URL: https://pure.spbu.ru/ws/files/85110335/_.pdf#page=96 (date of access 07/16/23)

[54] Birzhenyuk G.M. Schools in science and art as a form of ontological representation of social relay races // Modern reality through the prism of cultural knowledge: materials of the international. scientific-creative forum (scientific conference) “Scientific schools. Youth in science and culture of the 21st century" (November 12–13, 2020) / Chelyab. state Institute of Culture; comp., scientific. ed. A.V. Lushnikova. Chelyabinsk: ChGIK, 2020. pp. 32-40.

a creative environment that became a never-ending source of inspiration for hundreds of artists, writers and musicians.

Landscape painters of the Nidden colony created a new image of the incomparable cultural landscape that had developed on the Curonian Spit by the beginning of the 20th century. “For the Expressionists, the Curonian Spit was a mythical abode, akin to the Celtic Avalon, where tired heroes regain their strength, ordinary people live in harmony with nature, and the gods participate in joyful festivities.”[55]. More than 200 artists from all over Germany worked on the Curonian Spit for half a century. It was a real pilgrimage. The impression that the Curonian Spit left on their souls gave them the desire to live and work, even when the activities of the colony were interrupted by the Second World War. At the beginning of the 21st century, the Nidden colony was revived in the form of the international plein air “Nida Expression”, which is gaining more and more popularity every year.

The founders of another colony of German artists settled in Worpswede, whose rural idyllic images combined with the vibrancy of the picturesque surroundings attracted writers such as R.M. Rilke. Worpswede became the birthplace of many famous German impressionists and expressionists. Today, Worpswede Artists' Colony is a complex of exhibitions, galleries and art workshops.

The colony at Ahrenshoop also has a history of more than a century. After the Künstlerhaus Lucas was built[56], many artists attracted here, captivated by the magic of the local landscape. By the beginning of the 20th century, Ahrenshoop had become a favorite place for artists of the “November Group”, the “Blue Rider” and “Bridge” circles. Their creativity was inspired by the “changeable play of nature.” The GDR government turned Ahrenshoop into a resort for cultural figures. After the reunification of Germany, the Künstlerhaus Lucas became a creative outlet for fellow artists from all over the

[55] Return of cultural heritage: exhibition of works by artists of the Nidden colony for the first time on the Russian part of the Curonian Spit. May 20, 2009. URL:http://www.park-kosa.ru/site_news/157.html (date of access 07/16/23)
The artists' colony in Nida celebrated its 15th anniversary [Electronic resource] URL:http://artinternational.ru/viewtopic.php?f=45&p=21751 (date of access 07/16/23)

[56] Künstlerhaus Lucas: a place for the creativity of artists, writers and composers. URL: http://www.paiberdin.org/issues/issue44_rus.html (access date: 09/10/2020)

country. Thanks to the cooperation of various cultural institutions throughout the Rostock region, concerts and readings appeared, the museum became a place for permanent exhibitions and a center for scientific research. The activity of the House of Artists also extended to the countries of the Baltic region. The establishment of a publishing house, cooperation with the Schwerin Film Festival, and the development of individual tourism further enriched the palette of events. The fabulous landscape, rich historical heritage, actively developing creative environment of Artists' Houses and Galleries attract numerous guests to Ahrenshoop every year.

It is known that the famous Finnish composer Jean Sibelius attached great importance to the environment influence on his creativity. When composing his famous symphony “Finland”, Sibelius imagined the expanses of Aulanko, a national park created on the basis of a forest near his hometown of Hämenlinna in 1883. In addition, in 1894 he wrote in one of his letters: “Other forms of art have a greater influence on me than the music of other composers”[57]. Sibelius highly valued communication with artists and was inspired by their works, the beauty of Finnish nature and the special atmosphere of the Ainola villa, built for him by Lars Sonck. This house, in his own words, was “vital” for his work. Similar stories are associated with the residences of other representatives of Finnish national romanticism, many of whom were part of Jean Sibelius’ social circle.

In St. Petersburg, similar examples of residences include the famous dachas of artists, such as the dachas of the Benois family, “Penates” by I.E. Repin, dacha A.G. Rubinshteina and others.

The house, as a work of art, specially designed for creative activity and built in a special way surrounded by a natural landscape, has become one of the symbols of the era of Art Nouveau and national romanticism. The ideas of interaction between philosophy, architecture and the arts, including the creation of “complex works of art,” were developed throughout the 19th and early 20th centuries; many architects and artists tried to apply them when creating their own homes. The most striking example of this particular concept was the Darmstadt artists' colony, the most architectural in its concept,

[57] Sibelius and the world of art / ed. H.-L. Paloposki. Finnish National Gallery, 2014. P. 85.

in contrast to the previously mentioned examples. The idea of natural contrast is expressed by the placement of the complex on Matilda Hill, contrasting with the surrounding plain.

The Academic Dacha of the St. Petersburg Academy of Arts occupies a special place in the history of artistic residences. The dacha was created on the initiative of a prominent public figure, entrepreneur, philanthropist and art collector Vasily Aleksandrovich Kokorev, as a place for summer creative practices for low-income students of the Academy of Arts. Since 1884, students at the dacha received everything they needed for painting, reading and playing music. The house with workshops and a dining room is located on a small hill on the shore of the lake, in a picturesque park. The dominant feature of the ensemble was the octagonal pavilion, created a year later "in order to decorate the area and attract the attention of the surrounding peasants." The dacha retains its function to this day within the structure of the Union of Artists; a short break in its work occurred in the pre-war Soviet period, when it served as a pioneer camp.

Based on the experience of artist colonies and creative residences, a system of Houses of Creativity was created during the Soviet period. One of the striking examples is the All-Union House of Creativity of the Union of Artists of the USSR on the shore of Lake Senezh near Moscow, which included in the 1960s. A unique experimental design studio "Senezh" also appeared. It was there, in fact, that the theory of the "environmental approach" in architecture and design was formed, laid down in the 19th century, which in our time has become the basis of programs in the field of environmental design in Russia. The House of Creativity was known for its outstanding international events, plein airs and symposia, in which representatives of the countries of the socialist camp participated. After perestroika, like many creative houses, the studio ceased to exist due to the cessation of government funding. Many studio graduates and other members of the Union of Artists, who actively worked in art houses, began to travel to other countries with their master classes. Probably due to this, the experience of socialist art houses and "creative dachas" had a significant influence on the formation of modern models of Art Residences around the world. Unfortunately, only a few creative dachas survived and preserved their traditions in the new conditions, after Perestroika, and the new format of

Art Residences began to develop in Russia relatively recently, from the mid-2010s. The development of the artist's professional experience in the working conditions of creative cottages, which created conditions for the exchange of experiences of artists, as a method of professional development, "confirmed its productivity and allowed the formation of a number of creative personalities"[58].

The given examples partly correspond to the explanation of the mechanism of the emergence of "schools" in the field of art and science in the "theory of social relay races" by V. M. Rozov, in which the main method is the "translation of a model"[59]. The theory of creativity, in contrast, allows us to talk about the interaction of the "4Ps" of creativity as a possible basis for the mechanism of functioning of the creative environment, as a result of the launch of which a complex creative "Product" arises, and it becomes possible to launch a creative "social relay race", as a result of increased productivity of communities and individual artists.

At the same time, the aspect of the influence of the local landscape on architecture, as well as their synthesis, on the creative activity of residences, which is considered extremely rarely and as if in passing, seems to be insufficiently studied. At the same time, it seems obvious that the development of the landscape genre and the desire to use natural materials in architecture, emphasizing the connection of architectural ideas with the natural landscape, is preceded by a change in the perception of the environment in the context of artists' ideas about beauty, which are increasingly influenced by the beauty of the pristine nature, which becomes especially noticeable in the example of northern modernity.

Most of the colonies and residences of artists, which have retained or restored their function as working creative residences, rather than museums, for a century or more, are inspired by the very "spirit of the locality," which, apparently, determines the sustainability of their existence. Interestingly, a characteristic feature of two of them is their unique location on narrow peninsulas between the Baltic Sea and the Curonian

[58] Budkeev S.M. Creative dachas in the formation of the style of the artist Mikhail Budkeev // Cultural heritage of Siberia. 2020. No. 1 (29). P. 121.

[59] Rozov M.A. Theory of social relay races and problems of epistemology. M.: New Chronograph, 2008. 351 p.

(Nida) and Constance (Arenshoop) bays, which gives a special drama to the landscape. At the same time, most of the mentioned residences, located in a natural environment, have among their landscapes water bodies that form an additional dimension of the landscape, the experience of experiencing the border of water and land, contemplating the horizon line and reflections, as an experience of the Beautiful and Sublime, so necessary for creativity.

Currently, the creation of Art Residences is popular all over the world as a social innovation. There are various online resources, associations and associations of art residences that help artists choose suitable programs and places for creativity, and residents and tourists keep abreast of current creative projects[60]. The demand for creative mobility is growing, and participation in a residency has a positive impact on the status and development of an artist's career. The exact number of residences in the world is difficult to establish; judging by open resources, it exceeds 1,500, while in France alone there are about 250. Many art residencies operate at universities providing training in the field of arts[61], however, this format has not yet become widespread in Russia. In total, there are just over forty art residencies in Russia, of which, according to the Association of Art Residencies of Russia, only half are actively working[62].

An in-depth analysis of the environmental conditions for the emergence of historical and modern creative residences deserves a separate study, however, in the light of trends in the development of creative industries[63], as well as revitalization and involvement of historical estates in tourism[64], the formation of tourist destinations based

[60] Residency Programs Profiles [Electronic resource]. URL:https://artistcommunities.org/directory/residencies (date of access: 08/18/2023)

[61] For example: In Trinity Term, the College invites a professional artist to be our Artist-in-Residence [Electronic resource]. URL: https://www.sjc.ox.ac.uk/college-life/art/artists-in-residence/ (date of access: 08/18/2023)

[62] AiR of Russia – Association of Art Residencies of Russia [Electronic resource]. URL:http://airofrussia.ru/ (date of access: 08/18/2023)

63 Putin instructed to update the Concept for the Development of Creative Industries until 2030 [Electronic resource]. URL: https://tass.ru/ekonomika/18527845 (date of access: 08/18/2023)

[64] The Ministry of Economic Development will develop a model for involving historical estates in tourism [Electronic resource]. URL: https://www.economy.gov.ru/material/news/minekonomrazvitiya_razrabotaet_model_vovlecheniya_istoricheskih_usadeb_v_turisticheskiy_oborot.html (access date: 07/30/2023)

on cultural heritage sites according to the model of Art Residences, including those at universities, seems very promising for Russia.

2.2. The influence of the creative environment on the development of professional competence of the environmental designer and the creation of creative "Products"

At the previous stage of the study, individual historical examples of the actualization of the concept of "creative environment" were considered and a brief overview of current trends in the development of art residences as a form of organization of the creative environment was given. In the current section of the dissertation, a "mechanism of functioning" of the creative environment will be developed, clarifying the principle of interaction of its elements to obtain the "effect of the creative environment", as a communicative aspect that helps to form new impressions and competencies, develop creativity, and also create creative products, in particular, within the framework of educational and creative activities in a university setting[65].

The relevance of the study is due to the tasks of improving the personnel training system for the implementation of the "Comfortable Environment" program, as well as the development of creative industries as an element of innovative economic development. The creative environment as an element of the formation and development of the productivity of a creative personality is used quite rarely and can rightfully be considered an innovative technology. It is based on the theory of creativity, which was formed in the 60s of the twentieth century, but still continues to actively develop, thanks to the significant growth of the scientific base of cognitive sciences and the emergence of new research methods.

The scientific problem lies in the disunity of ideas about the possibilities and principles of using the creative environment. Against the backdrop of the rapid development of various sciences in the field of sustainable development, psychology of perception, cognitive science and neuroscience, it is necessary not only to develop

[65] Petrashen E.P. Formation of a model of a creative educational environment using the "Black Box" and "Compensatory Homeostat" methods // Proceedings of the Russian State Pedagogical University named after. A.I. Herzen. 2022. No. 203. pp. 228-240.

interdisciplinary professional competence of environmental designers, but also a high level of creativity at all levels of work.

The practical problem of developing creativity and interdisciplinary competence of environmental designers in the modern education system seems extremely acute, since classical school and university models of education often hinder its formation. For students mastering creative professions, this problem is especially relevant, since in art there is no way to find out the "correct answer" to a problem or to learn all the "rules" in advance in order to avoid mistakes in the work. Beginning designers experience, in this regard, severe discomfort; the fear of error becomes a significant obstacle to the development of their creativity, and the habit of a disciplinary model of learning makes it difficult to form interdisciplinary professional competence.

The objective of this section of the study is to develop a model of the mechanism of functioning of the creative environment, aimed at creating a "creative environment effect", promoting the formation and development of interdisciplinary professional competence and creativity of environmental designers, active interaction of participants and synthesis of information in the conditions of the creative process, creation of creative products, including complex works of science and art in the field of environmental design, corresponding to the parameters developed in the previous stages of the study.

During the work, a number of studies on the theory of creativity were analyzed[66], formation of a creative environment[67] in educational institutions[68] and methods for developing creativity[69], as well as the phenomenon of artist colonies and artist

[66] Borovinskaya D.N. On the issue of classification of theories of creativity // Bulletin of TSU. 2014. No. 385. pp. 50-56.

[67] Kaufman J.C., Sternberg R.J. The Cambridge handbook of creativity. 2nd ed. Cambridge: Cambridge University Press, 2019. 761 p.

[68] Moroz V.V., Sakharova N.S. Development of students' creativity in the process of creative-value interaction "teacher-student" // Bulletin of the Orenburg State University. 2018. No. 6 (218). pp. 61-69.

[69] Barysheva T.A., Zhigalov Yu.A. Psychological and pedagogical foundations of the development of creativity: a textbook for students of higher educational institutions. St. Petersburg: Publishing house SPGUTD, 2006. 268 p.

residences[70] and modern use of cultural heritage sites[71]. Sources directly devoted to the problem of developing the creativity of design students in the context of the tasks of preserving cultural heritage sites have not been identified. Toolkit of categorical-systemic methodology[72], which has been successfully used in research in a variety of scientific fields, is used, in particular, to study interactive teaching methods[73], the tools and technologies of which include the creative environment. Also, in the context of this study, the experience of applying homeostatic theory in the study of museum communication is interesting[74].

The theory of creativity, at the present stage, includes both the main elements known as the "4Ps" of creativity, namely: "Person", "Process", "Press" and "Product"[75], as well as cognitive aspects of creativity, such as primary and secondary thinking processes, cognitive disinhibition, defocused and focused attention, continuum, access to the continuum and variability, revealed in later studies, most thoroughly systematized in the works of Dorfman L.Ya., Petrovs V .N. and A.N. Of particular importance for our research is the experience of creativity pedagogy, which takes into account the psychological and environmental aspects of the formation of creativity, considered by T.A. Barysheva.[76], Eliseeva E.[77] and others.

[70] Petrashen E.P. Creative environment. The phenomenon of artist colonies, dachas and estates of cultural figures // Collection of articles. report All-Russian conf. "Problems of reconstruction and restoration of monuments of historical and cultural significance." St. Petersburg: St. Petersburg State University Publishing House, 2011. pp. 102-106.

[71] Peleikis A. The case of Nida (Curonian Spit) // Acta Historica Universitatis Klaipedensis. 2006. Vol. 12. P. 101–114.

72 Boush G.D., Razumov V.I. Methodology of scientific research (in candidate and doctoral dissertations). M.: Infra-M, 2020. 227 p.

[73] Vasilyeva A.V. Construction of the definition of the category "interactive learning" using the method of two-level triadic decoding of the category // Izvestia of the Russian State Pedagogical University named after. A.I. Herzen. 2021. No. 200. pp. 101-113.

[74] Kildyusheva A.A. Studying the museum as a category of thinking: experience in applying the apparatus of the theory of dynamic information systems // Ideas and ideals. 2019. T. 11. No. 2, part 2. P. 420-438.

[75] Rhodes M. An analysis of creativity // The Phi delta kappan. 1961. T. 42. № 7. C. 305-310.

[76] Barysheva T.A., Zhigalov Yu.A. Psychological and pedagogical foundations of the development of creativity: a textbook for students of higher educational institutions. St. Petersburg: Publishing house SPGUTD, 2006. 268 p.

[77] Eliseeva E., Makarova G., Feshchenko V. et al. Features of preparation of creative professionals in the educational environment of the modern university // International Review of Management and Marketing. 2016. Vol. 6. IS. P. 300-306.

Some research in neuroscience for design and architecture presented at the ANFA 2018 "Academy of Neuroscience for Architecture" conference[78], speak of the special value and uniqueness of the impact of historical, compositionally complex architecture, sometimes replete with decor, especially floral, as well as the diversity of images of the natural environment, on human cognitive activity and psychological stability[79].

In this regard, the task of creating a creative environment takes on a new context due to the possibility of using historical buildings as the basis for its modeling. This approach to this task will expand the possibilities of preserving and modern adaptation of architectural monuments, the value of which, thanks to the additional benefits identified by scientists from interaction with them, increases significantly and receives a new justification, which allows us to raise the question of using their potential to create a creative environment, including , formation of a creative environment in the structure of educational institutions for the development of creativity among students, in particular, educational programs in the field of environmental design.

It is assumed that the formation and use of a developing creative environment in the educational process, including based on the architectural and historical environment of cultural heritage sites, can serve as an effective tool for developing the creative potential and creativity of students in the “Environmental Design” direction. The model of the mechanism of functioning of the creative environment should include factors of the material environment in which the educational and creative process “Press” is implemented, the scenario or principle of organizing the activity “Process”, the characteristics of the participants in the interaction “Person” and the planned result of creativity “Product”, according to the theory of creativity.

In the future, such a model can be used to design a unique developmental environment, as well as create the effect of a creative environment when organizing the educational process and practices, to increase the efficiency of team work on projects,

[78] Vinogradova E.I., Kilimnik E.V. Analysis of architectural and psychological studies of the late 20th – early 21st centuries // Artikult. 2020. No. 3 (39). pp. 137–148.

[79] Conference in which the author directly participated with a poster presentation: ANFA 2018 CONFERENCE: Shared Behavioral Outcomes (September 20–22, 2018) [site] / Salk Institute for Biological Studies, La Jolla; Official website of the Academy of Neuroscience Conference for Architecture (USA). – Mode of access: https://www.anfarch.org/programs-events/conferences/2018-2/ (date of access: 07/20/2021).

conduct master classes and other events aimed at intensively improving the skills of participants, both in environmental design and related fields.

A model of the mechanism of functioning of the creative environment can be developed on the basis of the theory of creativity and homeostatic theory, using a categorical-systemic approach.

To build a model of the functioning of a creative environment, reflecting the nature of the human resource entering and exiting this environment, as well as the mechanism of influence of interrelated environmental factors on it, the categorical methods “Black Box” and “Simple Compensatory Homeostat” were used.

Analysis of the literature made it possible to identify the fundamental theoretical principles for creating the model, the necessary terms, concepts and categories. The theoretical basis of the study was the theory of creativity, as well as neuroscience data on the cognitive and mental processes of creativity, the influence of the environment on creativity, cognitive and psychological processes in general.

The following concepts are used in the study: creativity, as a manifestation of the ability to make original and creative solutions and the ability to be creative in general; the creative environment, including the educational one, as a complex of material and intangible conditions and resources that allows this ability to be actualized, especially among students within the educational process; interactive learning, as an educational technology and teaching methodology, built on the interaction of the student with the educational environment and other participants in the educational process.

Categorical-symbolic research methods within the framework of homeostatic theory were chosen as a scientific and methodological approach.[80], since the purpose of the study is to create a model that reflects the mechanism of interaction between elements of a creative educational environment as a self-organizing system. For this purpose, in comparison with the “Black Box” model used at the previous stage of the study, it is necessary to obtain a more detailed understanding of the functional system that transforms X into Y, where, in the case of a creative environment, Y is not only new competencies

[80] Boush G.D., Razumov V.I. Methodology of scientific research (in candidate and doctoral dissertations). M.: Infra-M, 2020. 227 p.

and creativity, but and a specific creative product. If any contradiction, competition or exchange of resources is identified in the system, as was also done at the previous stage of the study, it is advisable to use the method of simple compensation homeostat, which allows us to identify the mechanism of interaction of elements and redistribution of the main resource for which competition occurs (Fig. 12).

This model has elements of incoming and outgoing flows, similar to those discussed earlier using the example of the “Black Box” model, but the number of these flows is doubled, and the “box” itself is divided into two interacting parts in which exchange occurs. “Adders” synthesize the feedback of one element of the system with the incoming flow of another element, which ensures the coherence of the system. The life cycle of a system is determined by the nature of the feedback, positive or negative, which ensures progress, isogress or regression of the system (Fig. 13).

According to the theory of creativity, the necessary components of the formation of a creative environment are “Person”, “Press”, “Process” and “Product”. Taking into account the presence in the educational process of two categories of “Persons” – the student and the teacher-designer or artist-practitioner, as well as the contradiction contained in the need for independent cognitive and creative activity of the student along with the need to organize his training, allows us to present the “Black Box” in the form models of a simple compensatory homeostat, in which the two “incoming flows” are “Person-1” (students) and “Person-2” (teachers, designers or artists), and the outgoing ones are environmental designers, as “Persons” with formed and/or increased the most important competence in the field of environmental design – creativity.

The elements of the transformative environment are: Element-1 – the material environment, including the architectural environment, equipment – “Press” and examples of the “Product” or the “Product” itself, the material expression of a creative idea, which is in the process of formation, and Element-2 – “Process”, its script, main challenge, intensity and content, and the “Personas” included in it that influence Element-1. Feedback – the results of mastering the environment and studying examples of the “Product” and/or the “Product” itself, created by “Persona-1”, interacts with the experience of other “Persons” and the “Process” formed by “Persona-2”. At the same

time, both the “Process” and other “Personas” inevitably influence the independent experience of “Persona-1”. The main resource is the time and creative energy of the system participants. The creative “Product” of each category of “Persons” becomes synergistic as a result of the interaction of all elements of the system, while the “Product” of each of the “incoming flows” becomes the formation or development of creativity and other competencies of the environment designer (Fig. 14).

The life cycle of forming or increasing the level of creativity within the framework of the immersion of the “Person” in the creative environment is associated with the characteristics of cognitive processes when interacting with the material part of the creative environment, which is the “Press”. At the first stage, thanks to the factor of novelty and contrast when immersed in a creative environment, the cognitive processes of the “Persona” experience a “disinhibition” effect, which must be supported by positive feedback from Element-2 – “Process” and other “Personas”, in order to obtain rapid creativity progress. At the second stage, growth slows down, turning into an isogress, due to the need for analysis, possible negative feedback from Element-2, the crisis of adaptation and the associated process of inhibition of creativity. In a normal environment, the next phase is regression. However, the special quality of the material part of the creative environment, the “Press”, and the script of the “Process” should be a stimulating effect on creative activity, in connection with the formed emotional state of the “Person”. In this regard, as the perception of the environment by “Person-1” deepens, the awareness of the “Process” as a continuum and oneself as a part of it, “Person-1” connects to the continuum, the positive feedback from Element 2 intensifies, which again creates conditions for disinhibition and allows the development of Creativity, bypassing regression, to return to the stage of progress to end with the creation of a “Product” as a material expression of a creative idea. For “Person 2”, the stages of progress and isogress occur similarly, due to the change in the nature of feedback from “Person-1” and “Product-1”.

Thus, the transformation process ends with stabilization at the highest point of growth, which corresponds to reaching a new level of formation and/or development of the designer’s creativity through the experience gained in creating the “Product”. An

important factor and resource is the time limit of the “Process”, which is an independent stimulus for creativity, which is included in the scenario as the basis of Element-2 of the “Creative Environment” as a system. At the same time, the presence of a “Process” scenario helps to disinhibit creativity, as it reduces the stress associated with the need to make decisions about the activity scenario of each “Person” independently. The stages of the “life cycle” of the formation or development of creativity competence through immersion in the “Creative Environment” in the developed model are presented in the table. (Table 3).

A significant role in the functioning of this system is played by the “Press”, the material and spatial environment, as the basis of Element-1 of the “Creative Environment” and a catalyst for creativity, the presence of its contrast with the usual environment. The previously discussed examples of the historical experience of artist residences and colonies clearly demonstrate an increase in creative productivity when this condition is met.

Thus, a Model of the functioning mechanism of the “Creative Environment” has been obtained, revealing the principle of interaction between the material environment of the “Press”, the interaction scenario of the “Process”, the participants of the “Persons” and the material expression of the creative ideas of the “Product” in the creative environment, allowing the formation and/or development of creativity , as one of the core competencies of the environmental designer, and as the main resource of the environmental designer, through which he can transform the initial parameters of the environment, based on interdisciplinary knowledge and competencies, and corresponding material and technical resources, into a creative “Product”, which is the result of the convergence of science, technology and art. This model differs from examples of the use of the creative environment described in the studied sources by the presence of a graphical model of the creative environment, which is a tool for analyzing the existing elements to create the effect of the creative environment and its formation based on the model. The stages of such analysis are scenario and time modeling of the “Process”, taking into account a sufficient number and balance of competencies of “Persons”, including also more and less advanced participants in the profession, including those with different

competencies. The basis of modeling is the special qualities of the “Press” available for use – the material context for creating the effect of a “Creative Environment”, providing a contrast with the familiar environment, in accordance with the adequately posed task of forming the “Product” and the presence of its analogues-samples in the composition of the formed “ Creative environment”, which, taken together, becomes a catalyst for creativity.

Understanding the mechanism of functioning of the creative environment at the conceptual level allows us to move on to clarifying the design of the formation process and the characteristics of the professional competence of the environment designer, and the qualities of projects as products of the creative environment.

Modeling the mechanism of functioning of the creative environment on the basis of homeostatic theory using the method of simple compensation homeostat, for the first time, made it possible to identify and consider the mechanism of functioning of the “Creative Environment”, which determines the contribution of the result to the theory.

The model was developed as part of the educational system of the “Environmental Design” program at St. Petersburg State University, in the context of the problem of developing an interdisciplinary approach to design and a person-centered approach to the formation of professional competence and the development of creativity of an environmental designer, which determines the contribution of the result to the methodology of creative activity. In addition, understanding the mechanism of functioning of the “Creative Environment” can become the basis for further research in the field of development of creativity, creative performance and productivity, as well as therapeutic design.

The developed model and the technology for its application can be used in design practice, as well as in training personnel in the areas 54.03.01 and 54.04.01 “Environmental Design” and other areas in the field of art and architecture, including within the framework of additional educational programs and advanced training programs. In addition, the purposeful formation of the effect of a creative environment in universities can help increase the motivation of both students and teachers, including

increasing satisfaction from the educational process, as will be shown in the third chapter of the dissertation.

The continuation of the research is the development of a person-oriented model of professional competence of an environmental designer, which will allow, in the future, to evaluate the effectiveness of using the effect of a creative environment and a system of models of the concept of environmental design to increase creativity and design quality.

2.3. Logical-semantic model of professional competence and the mission of the environmental designer

At the previous stage of the research, a system of models was developed that summarizes, visualizes and clarifies scientific ideas about environmental design, as well as the mechanism for the functioning of the “Creative Environment”, in which one of the products is the growth of competence and creativity of Persons, as a result of their “immersion” in the “Creative Environment”. environment." In the current section of the dissertation, based on this theoretical basis, a system of models for the content of professional competence of an environmental designer will be proposed[81], which will then allow us to move on to modeling the process of its formation, taking into account the influence of the “Creative Environment”, along with conventional forms of training.

The formation of ideas about the professional competence of environmental designers and its mission is inextricably linked with the tasks of creating a comfortable living environment set by the “Comfortable Environment” program. The implementation of comfortable environment projects often faces conflicts of interest caused by the disunity of society, as well as the sectoral approach to urban planning, landscape, architectural, social, engineering and transport, and other areas in the urban environment management system. The competence centers being created are not yet fully able to overcome these conflicts due to the shortage of personnel with the necessary

[81] Petrashen E.P. Logical-semantic model of professional competence of an environmental designer and the concept of the “wheel of competencies” of the creative team // Architect: news of universities. 2022. No. 4 (80). URL: http://archvuz.ru/2022_4/33/ (access date: 07.25.2023)

interdisciplinary professional competence to take into account all aspects of the problem of a comfortable environment and find balanced solutions. The task and role of environmental design as an area of personnel training becomes the training of such specialists.

In order for this role to be successfully implemented in practice, when developing the professional competence of environmental designers, it is necessary to pay special attention to the synthesis of existing scientific and theoretical knowledge about the influence of the environment on humans, the role of environmental design in achieving sustainable development goals, the practice of design and implementation of environmental projects , the high-quality and effective implementation of which requires effective communication of all participants and beneficiaries. The basis for such training of environmental designers are the principles of convergence of science and art in the implementation of educational programs in this area.

The educational standard of St. Petersburg State University for bachelor's degree, 54.03.01 "Environmental Design", includes 14 universal and 23 professional competencies, composed of more than 170 competency indicators. Standard 54.04.01, master's degree, includes 10 universal and 17 professional competencies, including more than 130 competency indicators. Some competencies and indicators duplicate each other in meaning, despite their location in different competencies. The structure of the standard with the division of competencies into "Universal" and "Professional", including "General Professional" and "Profile Professional", "Academic" and "Practical" competencies, does not sufficiently structure and explain the variety of elements included in it. In addition, the number of competencies and their indicators provided by the educational standard constitutes such a significant amount of information that it complicates, rather than facilitates, planning and assessment of learning outcomes, does not allow systematizing the content, sequence, level and volume of mastering information and competencies, as well as forming a clear understanding of interdisciplinary connections and performance indicators in the field of environmental design. The disadvantages of the "packaging" of information in the standard include the lack of clarity, which is so necessary for representatives of the visual arts. The recently emerged

professional standard “Architect-Designer” does not solve the problem, but complicates it even more, mechanically combining two alternative areas of designer training, leveling both their differences and the possibility of individualizing the designer’s competency profile.

Thus, the scientific problem is that the specifics and content of the professional competence of an environmental designer are not fully defined, structured and scientifically substantiated, which makes it difficult to determine the role and qualifications of an environmental designer in the system of research and design activities.

The objective of this section of the study is to create a model of the professional competence of an environmental designer, as the basis for determining his mission and further developing the methodology for forming and assessing the qualifications of environmental designers.

To date, a fairly extensive base of theoretical research related to the field of environmental design has been accumulated, but relatively few sources consider the professional competence and role of the environmental designer as a holistic phenomenon that affects the quality of research and design, covering both personal qualities and knowledge, skills and abilities related to setting goals and choosing means to achieve them in environmental design.

The criterion for selecting sources was the competencies, knowledge, skills and abilities mentioned in the studies, as well as the forms of their assessment, coinciding, complementing or adjacent to the competencies provided for by the educational standards of St. Petersburg State University in the field of environmental design, reflecting interdisciplinary or transprofessional skills that are essential from the point of view of resolving the formulated scientific problem. Competency was used as a criterion for the critical analysis of the selected sources to ensure that the level of design corresponds to the theoretical foundations of the synthetic concept of environmental design, defined in the previous stage of the study.

A significant number of studies examine the issues of developing creativity, design thinking, education in the field of art and related areas included in the problems of

teaching environmental design. Convergent Paradigm[82] education in general, as well as in the field of environmental design, is also becoming increasingly widespread. A special place among studies in the field of environmental approach in architectural education is occupied by the works of Kiyanenko K.V.

Scientific publications on the topic of research highlight the following professional competencies of an environmental designer: artistic and visual competencies, which are considered mandatory for all creative specialties[83], related information technology competencies, which are defined as supra-professional and supra-industry for all professional areas[84]however, in fact, they are formed taking into account the specifics of the training profile. Interior and landscape design in professional skills competitions according to WorldSkills standards[85] are considered as independent competencies, like architectural design and design activities in general[86], mastery of design, materials and engineering sections of design, which can be presented in conjunction with economic aspects[87], and separately from them[88], although each of them includes a number of common elements or active qualities, and the existing differences appear at the level of

[82] Baksansky O.E. Convergence: methodology megascience // Philosophy and culture. 2014. No. 4 (76). S. 505-518.

[83] Shafikova R.Sh. Artistic disciplines as a basic, scientifically based factor in the formation of professional competencies // Prospects for higher design education in the conditions of Federal State Educational Standard 3++: Proceedings of the Interuniversity Scientific and Methodological Conference (November 30, 2020). M.: UVO MHPI, 2020. P. 56-62.

[84] Khristoforova I.V., Kucher R.V. Digital technologies and their impact on design education // Innovative technologies in modern education: Collection of materials from the VI International Scientific and Practical Internet Conference (December 12, 2018). M.: Scientific consultant, 2019. pp. 660-669.

[85] Fedorkov A.I., Krivonosov A.M., Grigorovich T.V. Experience in organizing, conducting and participating in professional skills competitions according to WorldSkills standards // Quality of vocational education: competencies of the modern labor market: materials of the Interregional scientific and practical conference (February 26–27, 2021) Gatchina: GIEFF Publishing House, 2021. P. 179-186.

[86] Larionova N.L., Lvova I.A. Preparing students for project activities in accordance with the requirements of the Federal State Educational Standard for Higher Education 3++ in the field of study 54.03.01 Design // Problems of modern pedagogical education. 2021. No. 71-1. pp. 204-207. URL: https://www.elibrary.ru/item.asp?id=46491161 (access date: 08/05/2020)

[87] Kuzina E.A., Petrova A.I. Historical and economic prerequisites for the formation of design skills among students of design training profiles // Bulletin of ChSPU. 2021. No. 1 (110). pp. 148-155.

[88] Zhukov D.D. Problems of teaching engineering disciplines to students specializing in “Interior Design” // Current problems of architecture of the Belarusian Subdvinia and adjacent regions: collection. Art. rep. scientific-practical seminar: Novopolotsk, October 8–9. 2015. Novopolotsk: PSU, 2015. pp. 201–210.

specificity of the materials, structures and technologies used. This generalization can be interpreted as a combination of competence and disciplinary approaches[89].

A lot of research is also devoted to the competence of scientific knowledge, which, as a rule, is not directly tied to environmental design and other arts, which makes it difficult for representatives of creative professions to adapt them. At the same time, much work has been devoted to the teaching and importance of the history of art, architecture and design in design education, but it is not easy to find studies that link these disciplines to the practice or methodology of design, in contrast to ergonomics, which is also considered an important professional competence of the environmental designer in research activities[90].

In addition to the completeness of knowledge and developed skills directly related to the content of environmental design and the process of professional development of a designer, such aspects of professional competence as competitiveness are considered[91], communication skills[92], teamwork, etc., which should also be taken into account when assessing the qualifications of an environmental designer, since these concepts reflect specific personality traits that determine its potential for the implementation of professional tasks. Also, a number of sources note insufficient attention in general to economic[93] and environmental[94] competencies in design education.

[89] Chan S. Environmental design and related disciplines // Man and culture. 2019. No. 6. P. 35-46. URL: https://nbpublish.com/library_read_article.php?id=31573 (access date: 07.15.2022)

[90] Tarasova O.P., Khaliullina O.R. Ergonomics in environmental design: guidelines for students in the educational program of higher education in the field of preparation 54.03.01 Design. Orenburg: OSU, 2020. URL: http://elib.osu.ru/handle/123456789/13471 (access date: 07/28/2022)

[91] Podkar S.B., Shalyminov A.O. Competitiveness as a function of competencies // Social innovations in the development of labor relations and employment in the 21st century. N. Novgorod: Publishing house NISOTS, 2014. P. 478-481.

[92] Petrashen E.P., Alferovsky K.A., Tolstova A.A. The role of employing organizations in the formation of the brand of the Environmental Design program // Marketing MBA. Marketing management of an enterprise. 2018. T. 9. No. 3. P. 104-126. URL: https://www.marketing-mba.ru/article/v3_18/Petrashen.pdf (access date: 07.20.2022)

[93] Fomina V.F. Modern problems of a comfortable living environment // Spaces of urban civilization: ideas, problems, concepts: materials of the International. scientific conf. (October 4–5, 2017) Ekaterinburg: UrGAKHU Publishing House, 2017. pp. 123-126.

[46] Özsoy V. Arts and design education for sustainable development // New Trends and Issues Proceedings on Humanities and Social Sciences. 2016. Vol. 2. № 1. P. 487-497. URL: https://www.un-pub.eu/ojs/index.php/pntsbs/article/view/335 (date of access: 25.07.2022)

[94] Arkhipova T.N. Ecodesign as a resource of the green economy // Culture and ecology - the foundations of sustainable development of Russia. Human capital as a key resource of the green economy: Part 1: materials of the international forum (April 13-16, 2018). Ekaterinburg: UrFU, 2018. pp. 54-57.

Analysis of foreign publications adds a number of aspects to this list in the field of education for sustainable development[95], necessary for the environment designer, such as post-evaluation[96], economic and environmental, in which there is a more systematic and practice-oriented approach[97], but artistic and creative competencies are considered to a lesser extent.

As a review of scientific publications showed, the description of the competencies of an environmental designer, as a rule, is carried out based on traditional approaches to art education, without analyzing the relationship with modern practice of environmental design, related fields of activity and data from modern science. However, the analysis of the above sources gives an idea of the main vectors of competence formation that underlie both traditional approaches and modern trends in teaching environmental design, however, they do not provide a general idea of it with sufficient completeness.

Our analysis of the scientific literature confirms that the most important problem, both theoretically and practically, remains the issue of systematization and achieving balance in the requirements for the competence of an environmental designer, determining the range of his tasks and responsibilities when developing projects, identifying the potential for the development of design methodology in in the context of sustainable development goals, the objectives of the convergence of science and art, as well as the synthesis of arts, identifying the relationships between competencies and bringing ideas about the professional competence of an environmental designer to greater certainty and validity.

The research hypothesis assumes that the mission of the environmental designer is to provide interdisciplinary synthesis in the field of creating a favorable environment for

[95] Lai Y.-C., Peng L.-H. Effective teaching and activities of excellent teachers for the sustainable development of higher design education // Sustainability. 2019. Vol. 12. № 1. P. 1-27. URL: https://www.mdpi.com/2071-1050/12/1/28 (date of access: 08.08.2022)

[96] Roberts C.J., Edwards D.J; et al. Post-occupancy evaluation: a review of literature // Engineering, Construction and Architectural Management. 2019. Vol. 26. № 9. URL: https://www.emerald.com/insight/content/doi/10.1108/ECAM-09-2018-0390/full/html?casa_token=7DoP5v5CkTwAAAAA:bizQgK0ldJeM_5M2xYp2e-PXV0XXXaXGAGwnoh8vVTkW3ozrz9hmByR7BPmI9z7NMpvX-VRgibu2C4mjMxf_LCFB54-rg_0oWLOw6r_Qjhs_sarV3vYa (date of access: 25.07.2022)

[97] Middleton H. Problem-solving in technology education as an approach to education for sustainable development // International Journal of Technology and Design Education. 2009. Vol. 19. № 2. P. 187-197.

living, which determines the nature of his professional competence and corresponds to the synthetic concept of environmental design developed at the previous stage of the study[98]. We believe that such a model can be obtained if it is developed on the basis of semantic directions that make it possible to combine individual competencies and/or their indicators into groups based on essential and semantic aspects, as well as to identify logical connections between them. The resulting model will allow us to perceive the content of educational standards as an integral system, eliminate duplication of competency indicators, clarify the levels of their formation, and begin the formation of a professional standard for an environmental designer.

The theoretical basis of the study is the paradigm of the convergence of science and art, as "increasing and transformative interaction between scientific disciplines, technologies, communities and spheres of human activity to achieve compatibility and integration"[99], sustainable development concept[100] and competency-based approach in education[101].

The research methodology was based on logical-semantic modeling (LSM)[102] according to the method of V.E. Steinberg[103]. The choice of LSM as the main scientific research method is due to its high heuristic nature, confirmed by numerous studies in the pedagogical field, as well as the conceptual correspondence of the method to the purpose of our research. In most cases, LSM is used specifically to identify semantic groups of data and logical connections between them in didactic models and systems.

[98] Petrashen E.P. Modeling the content and conceptual apparatus of the subject area "environmental design" as an object of study in the educational process // Art education and science. 2022. No. 3 (32). pp. 66-76.

[99] Baksansky O.E. Convergence: methodology megascience // Philosophy and culture. 2014. No. 4 (76). S. 508.

[100] Maltseva A.A., Shvets I.M., Veselova T.A. Interdisciplinarity as a means of achieving results that contribute to the formation of education for sustainable development // Modern education. 2018. No. 4. pp. 32-44.

[101] Mikhailova E.V., Andreeva O.P., Akhmetova S.P. Features of the formation of professional competence of designers in higher education // Pedagogy of Art. 2019. No. 2. URL: http://www.art-education.ru/sites/default/files/journal_pdf/mihaylova_andreeva_ahmetova_53-60.pdf (access date: 07.21.2022)

[102] Website of the Research Laboratory for Modeling Visual Controls of Logical-Semantic Type. URL: https://bspu.ru/unit/286/news (access date: 07/01/2022)

[103] Steinberg V.E., Manko N.N., Vakhidova L.V. Conceptual and graphic means of clarity: visual didactic regulations // II All-Russian Pedagogical Forum. 2020. pp. 107-115. URL: https://web.archive.org/web/20201121094759id_/https://www.sciencen.org/assets/DOI/KOF-195-SHtejnberg-Manko-Vahidova.pdf (access date: 07/01/2022)

The essence of the method is the creation of a kind of “coordinate system”, in the space of which the elements of the phenomenon under study are located, in accordance with the graphic interpretation of the relationships between them. Such modeling makes it possible to build associative connections that improve the perception and memorization of complex intellectual objects. The method involves a sequence of reading the model clockwise, starting from the left side of the horizontal axis of the model. In our study, this order, in part, may reflect the recommended sequence of mastering the relevant competencies at different stages of training.

The professional competence of an environmental designer is the result of training and practical experience, a synergistic sum of the formed competencies, knowledge, skills and abilities provided for by the educational standard in the field of environmental design and in demand in the practical field, as well as the result of their transformation in accordance with the individual orientation of the designer. That is why LSM seems to be an adequate method for systematizing and facilitating the perception of this complex intellectual object.

The research materials included the competencies and disciplines provided for by the educational standards and curricula in the direction 54.03.01 and 54.04.01 “Environmental Design” of St. Petersburg State University, as well as the results of bibliographic research and a system of models for the synthetic concept of environmental design, carried out at the previous stage of the research.

As part of the formation of a model of the content of environmental design, key vectors were identified in relation to which contradictions can be recorded, the search for balance in which forms the basis of the content of environmental design: ideological, research, creative and design. When forming a “coordinate system” based on the intersection of these axes, eight directions arise along which, according to the LSM methodology, individual competencies or their indicators can be placed, the totality of which should be reflected in the LSM of the professional competence of the environment designer according to the purpose of the study.

Based on bibliographic research, the main directions for the formation of professional competence of an environmental designer were identified, corresponding to

the resulting “coordinate system”. Thus, the “worldview” vector combined the personal qualities and communication skills of the designer with sociocultural competencies; the “research” vector combined competencies in the field of two methods of analysis and thinking: a systematic and rational research approach and irrational, empathy-based design thinking; the “creative” vector combined artistic and visual skills and abilities with mastery of information technology; “design” – readiness for architectural, design and engineering, including technical and economic design.

According to the studied literature, the experience of implementing the main undergraduate and graduate educational programs “Environmental Design” at St. Petersburg State University, as well as the practical project experience of the author of the study, refined competency indicators were developed. An example of the development and distribution of competency indicators of educational standards in the direction 54.03.01 and 54.04.01, environmental design of St. Petersburg State University, into different semantic groups obtained in the logical-semantic model of the competence of an environmental designer, is presented in Appendix 1 to this study (Table 3). The codes of competencies and their indicators were regrouped in accordance with the received semantic directions of the LSM, distributed along the axes of the resulting “coordinate system”, and then generalized and replaced by short and specific concepts for clarity of perception (Fig. 15, 16).

The competency codes correspond to the educational standard, where UC are universal competencies, GPC are General professional competencies in the field of design, PCA are academic professional competencies, and PCP are practical professional competencies in the profile of environmental design. The competency numbers correspond to the sequence of competencies in the corresponding block of the standard. The numbers of competency indicators included in the semantic group are given in parentheses.

As a result of the study, a generalized model of the professional competence of an environmental designer was obtained (Fig. 16), including key concepts or active qualities of universal and professional competencies and their indicators, distributed along four axes of competence formation (ideological, research, creative and design), which made it

possible to redistribute competencies by groups, in accordance with their content orientation and thus obtain professional “coordinate system”. Eight semantic directions for the formation of environmental designer competencies, obtained as a result of the intersection of these axes (individual soft skills – sociocultural competencies, artistic and visual – information technology competencies, design thinking competencies – research, architectural and design – technical and economic design competencies), structure the content of training and professional competence of an environmental designer in accordance with the results of bibliographic research and the previously obtained synthetic concept of environmental design.

Thus, based on the analysis of competencies, as well as their comparison with the system of models of the synthetic concept of environmental design, a logical and semantic model of the competence of an environmental designer has been developed. Aspects of competencies are distributed along the axes of the logical-semantic model, which correspond to the vectors of environmental design content identified in the first chapter. The resulting groups of competencies differ from those provided for by the educational standard by systematization into content and logical groups based on common “active qualities”, which makes it possible to simplify the perception of the content of educational standards and curricula and clarify the indicators of competencies. The resulting model can be taken as a basis for optimizing educational and methodological work when modernizing the programs of academic disciplines, namely, it can help in clarifying the distribution of competencies and content of training in academic disciplines and modules, as well as in developing a methodology for assessing the development of competencies.

The contribution to the development of the theory lies in the systematization, regrouping and clarification of competency indicators in accordance with semantic groups.

Scientific novelty is determined by the fact that logical-semantic modeling of competence in the field of environmental design was performed for the first time.

The advantage of the model is the identification of interdisciplinary connections between the competencies of an environmental designer and the logic of their priority formation in the educational process.

In the future, this model will be used as the basis for developing a system for assessing the individual competence profile of a designer and forming a “wheel of competence” for the creative team.

The contribution to the development of the methodology lies in the presentation of the entire complex of interrelated interdisciplinary competencies in the field of environmental design in a single logical and semantic model, as well as the possibility of applying the resulting systematization principle for the synthesis of competency-based, personality-oriented and disciplinary approaches in the formation of professional competence of environmental designers.

The contribution to the development of practice lies in increasing the efficiency of educational and methodological work, thanks to the universalization and synthesis of approaches to solving various problems in organizing the educational process.

In the next section of the dissertation, a study of the process of developing the professional competence of an environmental designer will be carried out, based on the result obtained in the current section of the dissertation.

2.4. Principles of formation and assessment of professional competence of an environmental designer and creative team

At the previous stage of the study, a logical-semantic model of the competence of an environmental designer was developed. In the current section of the dissertation, a study will be conducted of the process and principles of developing the professional competence of an environmental designer and a competent creative team on its basis[104].

The relevance of this stage of the study is determined by the tasks of training personnel and forming creative teams for the implementation of national projects in the field of creating a comfortable environment for living in Russia. The system of models of the synthetic concept of environmental design and the LSM of the competence of an environmental designer, developed at the previous stage of the study, allows us to get an

[104] Petrashen E.P. Facets of professional competence of an environmental designer: uniqueness and versatility // Academic bulletin of UralNIIproekt RAASN. 2023. No. 1 (56). pp. 94-98. URL: https://academvestnik.ru/wp-content/uploads/2023/03/16_av1-202356.pdf (access date: 04/1/2023)

idea of the interdisciplinary nature of the professional competence required by environmental designers, however, this is not enough to build the principles, sequence and logic of mastering these competencies, to determine the necessary levels of mastering various skills at certain stages of preparation and career growth, determine the principles of forming creative teams, which are proposed to be considered in this section of the study.

2.4.1. The principle of evolution in the formation of professional competence of an environmental designer.

The problem of this stage of the study is that the subject field of environmental design includes a significant number of competencies that cannot be fully developed at the same time, which requires determining the necessary and sufficient levels of development of various competencies at different stages and trajectories of education and professional career.

The formulation of this problem determines the task of studying and modeling the very process of forming the professional competence of an environmental designer, in order to identify its character and logic, without which its further optimization is impossible within the framework of improving the training system in the field of environmental design.

Many studies have been devoted to the problem of personnel training and the very process of developing competence in the field of art, architecture and design. Among them there are works on pedagogy, as well as works in the field of cultural studies, management and art history. As a criterion for selecting literature for our study, we chose to identify key approaches and aspects of the process of developing the professional competence of environmental designers.

When developing the professional competence of environmental designers, it is necessary to pay attention to the requirements of standards[105], learning technologies[106], especially design methods[107], development of applied methods for the formation of professional erudition and competence in general[108], as well as the theme of the convergence of science and art[109], in particular, the synthesis of existing scientific and theoretical knowledge about the influence of the environment on humans[110]. An important approach in design education for sustainable development is a focus on problem solving – "problem-solving approach"[111] and interdisciplinarity[112].

The research hypothesis assumes that the process of competence formation is of a nonlinear evolutionary nature, which is characterized by a gradual expansion and systemic complication of the area of competence of the environmental designer, based on its logical-semantic model. It is assumed that using the categorical-systemic methodology, a conceptual model of such a process can be developed. Conceptual modeling of the process and visualization of its nature can help optimize the system of training in environmental design and will allow us to move on to the creation of a system of levels for the formation of active qualities of competencies necessary for assessing the qualifications of environmental designers. The purpose of this stage of the study is to

[105] Larionova N.L., Lvova I.A. Preparing students for project activities in accordance with the requirements of the Federal State Educational Standard for Higher Education 3++ in the field of study 54.03.01 Design // Problems of modern pedagogical education. 2021. No. 71-1. pp. 204-207. URL: https://www.elibrary.ru/item.asp?id=46491161 (access date: 08/05/2020)

[106] Khristoforova I.V., Kucher R.V. Digital technologies and their impact on design education // Innovative technologies in modern education: Collection of materials from the VI International Scientific and Practical Internet Conference (December 12, 2018). M.: Scientific consultant, 2019. pp. 660-669.

[107] Popovtseva A.Yu. Using the real design method for students of the specialty "Design and Architecture" in the projection of the development of modern vocational and technical education in the Republic of Kazakhstan // Design and artistic creativity: theory, methodology and practice: materials of the Third International Scientific and Practical Conference (December 4, 2020) St. Petersburg .: Publishing house SPbGUPTD, 2020. P. 62-68.

[108] Zhang Lu, Martynova N.V., Dyachkova L.G. Pedagogical conditions for the formation of professional competence of design students in the process of teaching art history // Education and Law. 2020. No. 6. pp. 292-298.

[109] Loiko, A.I. Formats of culture of the 20th century, created by the convergence of science, technology, art // Collection of scientific works of employees of the department "History, world and domestic culture". Minsk: BNTU, 2018. pp. 95-106.

[110] Landscape theory [site] /Scenic Solutions. The science of scenery. URL: https://scenicsolutions.world/theory-of-landscape-aesthetics/ (date of access: 08.08.2023).

[111] Middleton H. Problem-solving in technology education as an approach to education for sustainable development // International Journal of Technology and Design Education. 2009. Vol. 19. № 2. P. 187-197.

[112] Maltseva A.A., Shvets I.M., Veselova T.A. Interdisciplinarity as a means of achieving results that contribute to the formation of education for sustainable development // Modern education. 2018. No. 4. pp. 32-44.

develop a conceptual model that reflects the nature of the formation of professional competence of an environmental designer.

The study is based on the theoretical principles of the Theory of Dynamic Information Systems (TDIS), formed in the late 1990s[113]. TDIS considers not only the structural, but also the functional level in the design of systems, which allows it to be used to consider the development of the competence of an environment designer as an independent phenomenon and process. TDIS considers such a phenomenon as "active qualities," which makes it possible to use this theory to develop the dynamic aspect of competence formation based on the logical-semantic model obtained at the previous stage of the study.

The study was carried out using the categorical-symbolic method "Finite Information Flow" (FIF). This method allows you to present an object in the process of its gradual development and complexity, which will allow you to identify the main stages of its formation and their content[114].

The FIF model considers the following elements:

IC is an information criterion that is used as a "measure of information" about an object.

LL is a logical level that reflects the degree of information interaction with an object or the depth of its knowledge. Each new LL indicates the opening of a new IC in the object, which corresponds to the progress of the system.

LB is a logical bound that reflects the breadth of coverage of the subject area of an object, the systemic complexity of its internal laws, which corresponds to the isogress phase of the system.

T – transformability, which provides freedom of combination and interaction of active qualities expressed by information criteria[115].

[113] Razumov V.I. Fundamentals of the theory of dynamic information systems. Omsk: Omsk State University named after. F.M. Dostoevsky, 2005. 212 p.

[114] Boush G.D. Clusters in economics: scientific theory, research methodology, management concept. Omsk: Omsk State University Publishing House, 2013. pp. 141-142.

[115] There, p. 142-146.

Using the “Finite Information Flow” method, an “ideal” evolutionary model of uniform expansion of the competence of an environmental designer was generally presented using the example of six years of study at a university. The quality of creativity is highlighted as the main resource that encourages him to expand his competence. The logical levels and limits of transformation of the area of competence in the model correspond to two-year stages of the educational process, including four years of study in a bachelor’s degree and two in a master’s degree (Figure 17). It is assumed that after completion of training, the expansion of competence can continue in a similar way, through the formation of practical experience and a system of continuing education.

As information criteria (IC) for the area of competence transformation (T), the model selected the state of the incoming competencies of an applicant admitted to the 1st year of study, which develop and expand within the framework of the first stage of training, (LL1) and (LB1), during the first two years . It should be noted that the description of information criteria (IC) or active qualities of competencies for this model is made at a more general level than in the previously developed LSM model, for the convenience of identifying only key aspects of the process under study. Its detailing in accordance with the active qualities of competencies specified in the LSM will be carried out at the next stage of the study.

At the first stage, in the field of transformation of professional competence, there are three information criteria (IC): the personal qualities of the student, his creative artistic skills and general erudition. As a result of immersion in the professional field of environmental design, each of the (ICs), as well as the variability of combinations of their interaction with each other, is expanded and clarified, in accordance with the professional direction, and therefore the first professional skills of environmental designers corresponding to (T1) are formed.

At the next stage, as a result of the experience gained by students at level (T1), new thinking algorithms are added to the original ones (IC). The development of the system at the second stage, (LL2) and (LB2) ensures the expansion of (T2) to the developed skills or competencies provided for by the educational standard of undergraduate education.

The third stage is characterized by a new IC, namely, the skills of scientific analysis, evaluation and reflection, the formation of which, along with the improvement of professional skills at the T2 level, determines an even deeper penetration of the student into the professional sphere of environmental design, (LL3) and (LB3), which determines formation and awareness of professional competence at the level of the requirements of the Master of Environment Design standard (T3).

The listed “incoming competencies” are determined, on the one hand, by the requirements of complete secondary education for school graduates, and on the other, by the requirements of entrance examinations to a university. In modern practice, for admission to undergraduate programs in environment design, it is necessary to provide Unified State Examination results in Russian language and literature, and in some universities – in social studies. It is also necessary to pass a creative competition, which can take the form of exams or a competition of documents and creative portfolios of applicants. The content of the creative competition is established by the university independently; accordingly, it is they who determine the average level of preparedness of 1st year students, from which further transformation of their competence begins.

Observations of the process of developing professional competence among students of degree course Environmental Design show that the most successful students have a high level of creativity, such as the will and ability to solve creative problems, openness and flexible skills, as well as erudition, which includes both a general cultural level and interdisciplinary knowledge related to varying degrees to environmental design. Composition and visual arts skills are also an important basis for further education. However, without creativity, openness and erudition, they are not a guarantee of developing competencies in the field of environment design. Unfortunately, the impersonal methodology for conducting entrance tests, adopted at present, does not allow us to fully identify the entire complex of these qualities, which often leads to admission to study of applicants who are not quite ready to solve problems in the field of environmental design. As a rule, this is expressed in isolation, avoidance of communication, fear of mistakes, unpreparedness for experimental and exploratory creative activity, lack of curiosity in areas of knowledge related to environmental design,

such as the history and theory of design, architecture and art, ecology, construction and others. The turning point that reveals the features of the process of developing competencies in students, as a rule, is the results of training in the second year of a bachelor's degree.

By this time, students' artistical and visual arts skills have leveled out to a significant extent, and the ability to combine skills, put forward and test creative hypotheses comes to the fore. On their basis, at the next stage of the formation of professional competence, design thinking skills and initial research ideas are developed, allowing one to take into account a variety of initial project data, ways of setting creative problems and options for their solutions. At the same time, professional erudition continues to expand, including both sociocultural competencies and technical and economic ones, and more and more information technology and design skills are being formed, allowing the development of more complex and comprehensive projects than at the first stage of training.

The third stage of the formation of professional competence corresponds to master's studies, the main task of which is the development of research skills against the background of improving the entire complex of professional competencies already formed at the basic level. As a result, the area of competence transformation (T3) should include the entire set of abilities, knowledge and skills that are recognized as competencies, thanks to their active synthesis and their simultaneous use. The professional competence of the "ideal" environmental designer, as in the LSM model, seems to be developed evenly in all areas in this model, but in practice this is not always achievable. This problem will be discussed in more detail at the next stage of the study.

As a result of the study, a conceptual model of the evolutionary process of formation of professional competence of an environmental designer was obtained, including logical limits, levels and areas of competence transformation, as well as identifying creativity as a resource in the process of development and expansion of competence. The novelty of the result lies in the fact that this model complements the logical-semantic model of the professional competence of an environment designer obtained at the previous stage with an idea of its dynamics as an information flow and the

evolutionary nature of the process of its formation. The positive effect is that this model allows us to move on to detailing the order and expected levels of competence development depending on the stage of training or career growth of an environmental designer.

The contribution to the development of the theory lies in the fact that the process of formation of professional competence is presented in the form of an increasing information flow, demonstrating a gradual change in the levels of formation of professional competence, as an independent phenomenon.

In the future, the resulting model, together with the LSM of the professional competence of an environmental designer, can be used as the basis for a methodology for the formation and assessment of professional competence of environmental designers.

The contribution to the development of the methodology lies in the use of the "Finite Information Flow" method as the development of LSM professional competence, to identify the dynamic information and evolutionary nature of the process of its formation.

The contribution to the development of practice lies in the possibility of using the model to analyze and optimize the training process in environmental design.

In the next section of the dissertation, a system of expected levels of development of professional competencies of environmental designers will be developed, depending on the stages of training, based on what was obtained in the current section of the dissertation.

2.4.2. The principle of matching the level of system complexity with the professional competence of the environment designer and the stage of its formation.

In the previous section, a diagram of the evolutionary process of developing the professional competence of an environmental designer was proposed. In the current section, a more detailed system of expected levels of competencies at different stages of training will be developed, corresponding to the active qualities of competencies identified in the LSM.

The relevance of this section of the study is determined by the need to plan the stages and levels of the process of developing competencies when organizing training.

The problem is that educational standards in the field of environmental design do not provide an idea of what levels of competencies are achieved at different stages of education. In addition, there is the problem of determining the necessary and sufficient levels of development of candidates' competencies when hiring them.

The analysis of the literature within this stage of the study includes sources related to the generalization of the experience of training designers in general, the competency-based approach, as well as the peculiarities of mastering individual disciplines and competencies by future designers. Works were used that considered both methods of formation and methods of assessing the professional competence of environmental designers.

Among the works devoted to methods of forming and assessing the professional competence of environmental designers, one should mention the works of Larionov N.L. and Lvova I.A., dedicated to preparing students for project activities[116], Kovaleva L.A. and Gavrilyuk E.A. dedicated to the use of design methods[117], and Mikhailova E.V., Andreeva O.P., Akhmetova S.P., studying pedagogical conditions and features of the formation of competence in teaching various disciplines[118], Bakhlova N.A., which developed diagnostic complexes[119], involved in the formation of competencies. Experience[120] and principles[121] the formation of competencies when preparing a designer at a university is also actively studied and generalized.

[116] Larionova N.L., Lvova I.A. Preparing students for project activities in accordance with the requirements of the Federal State Educational Standard for Higher Education 3++ in the field of study 54.03.01 Design // Problems of modern pedagogical education. 2021. No. 71-1. pp. 204-207. URL: https://www.elibrary.ru/item.asp?id=46491161 (access date: 08/05/2020)

[117] Kovaleva L.A., Gavrilyuk, E.A. Using the design method in studying the discipline "Construction in environmental design" // New ideas of the new century: materials of the international. scientific conf. FAD TOGU. 2020. T. 2. pp. 493-497. URL: https://elibrary.ru/item.asp?id=42933466 (access date: 06.15.2022)

[118] Zhang Lu, Martynova N.V., Dyachkova L.G. Pedagogical conditions for the formation of professional competence of design students in the process of teaching art history // Education and Law. 2020. No. 6. pp. 292-298.

[119] Bakhlova N.A. Formation of professional competencies of future designers on the basis of an interdisciplinary diagnostic complex (in the educational process of a university): dis. ...cand. ped. Sciences: 13.00.08. Kaluga, 2017. 244 p.

[120] Antonenko Yu.S. Analysis of the experience of developing competencies during designer training at a university // Philosophical and pedagogical problems of modern education. 2019. No. 1. P. 216-219.

[121] Davydova E.M., Radchenko V.Yu., Radchenko O.S. Principles of universal design as the basis for the formation of professional competencies of designers // Philological Sciences. Questions of theory and practice. 2016. No. 4 (58). Part 1. pp. 186-190.

The very concept of a designer's competencies is inextricably linked with the interpretation of the essence of environmental design, which is often subjective. When talking about conceptual models created to describe the essence and improve the quality of design, the first association is often the "Vitruvius triad"[122], which for this very reason was used in the previous stages of the study as the basis for the development of conceptual models of environmental design. The number of later concepts, algorithms, patterns and templates in the history of architecture and design is large and varied; this theoretical heritage is quite actively studied and periodically causes heated discussions in scientific circles, but is extremely rarely used by Russian practitioners as an aid in real design and does not have enough influence on education. At the same time, even theoretical consideration and discussion of various ideas and concepts in the educational process, as well as scientific disputes related to them[123], capable to a large extent promote the development of design thinking and professional competence among students.

The research hypothesis believes that the real process of competence formation, in contrast to the ideal model, occurs unevenly for different groups of competencies. It is assumed that there is an optimal sequence and characteristics of the levels of competence development at each stage, which can be developed using a synthesis of the competence and knowledge approach based on the categorical-systemic methodology. Conceptual modeling of the process and levels of formation of active qualities of competencies can help optimize the system of training in environmental design and will allow us to move on to the creation of a system for assessing the qualifications of environmental designers.

The goal of this stage of the study is to develop a conceptual model that reflects the sequence and expected levels of competence development at different stages of training.

A flexible combination of personality-oriented, knowledge-based and competence-based was chosen as a scientific and methodological approach.[124] approaches to learning

[122] Lebedeva G.S. The newest commentary on Vitruvius's treatise "Ten Books on Architecture". 3rd ed., rev. M.: URSS, 2020. 208 p.

[123] Figured G.N. Paradigmatics of modern architecture: analytics and declarations // Architecture and modern information technologies. 2019. No. 2 (47). pp. 71-82.

[124] Petrashen E.P. The concept of a personality-oriented model for training environmental designers at St. Petersburg State University // Architecture and Construction of Russia. 2020. No. 2. P. 46-49.

and categorical-systemic methodology of scientific knowledge[125]. The study was conducted using the categorical-systemic method "Order of Goals" (OOG). This method allows you to develop a high-quality model of an object, which reflects the parts of the object and the object itself as a whole, taking into account the hierarchical structure of its internal organization in time. The modeling is also based on the "Competency Ladder" scheme used in business training. Despite being overly simplified, it gives a clear idea of the essence of professional "ascent" of competence, which made it easier to detail this process using the OOG method.

The "Order of Goals" method made it possible to present the sequence of development of competencies and the specifics of each period of training from the point of view of the sequence of formation in the logic of professional training. At the first stage of development, the final Goal of the process under study, Professional competence of the environment designer or Object-quality (OQ) in the terminology of the method, is presented as a set of groups of competencies identified in the LSM, or "sub-qualities" (SQ) and integrative quality (IQ), "packed" into a common shell of the Goal. Thus: OQ – professional competence, as a goal or object-quality, active qualities of competency groups SQ (1-8) – "subgoals" or "sub-qualities" corresponding to the LSM formed at the previous stage, IQ – integrative quality or "supergoal" , a resource that ensures the development of the system (Fig. 18).

To develop the next stage, it is necessary to set a coordinate system in which the horizontal scale corresponds to periods of training, and the vertical scale reflects the "Levels of system complexity" of the formation of "sub-qualities" at each stage of the process. Then, sub-qualities and the degree of their formation can be presented as intermediate goals of the process and placed at different levels in the space of the coordinate system. When developing the System Complexity Level scale, concepts from the "Ladder of Competencies" model used in business education were used[126], in combination with the concepts of the "Knowledge-Abilities-Skills" (KAS) model, which

[125] Boush G.D., Razumov V.I. Methodology of scientific research (in candidate and doctoral dissertations). M.: Infra-M, 2020. 227 p.

[126] For example, the "Ladder of Competencies" model was used in the "Manager" course by Victoria Shukhat (URL: http://www.victoria-training.ru/ (date of access: 09.09.2022)).

made it possible to propose a more informative scale of levels of competence development. Thus, the “Ladder of Competencies” model, improved using the OOG method (Fig. 19), allows us to present the expected levels of formation of the active qualities of competencies at different stages of training.

Thus, the development of designer competence was presented in the form of a model “Ladder of Environmental Designer Competencies”, which sets a scale for assessing qualifications for any of the groups of competencies, using the Categorical-Symbolic method “Order of Goals”. The levels of the “ladder” on the vertical scale of system complexity synthesize “competency” and “knowledge” models of learning, which allows us to consider the process more fully than in each model separately. The horizontal scale corresponds to twelve semesters or six years of study. At the same time, each two-year stage of the cycle contains a period of consolidation of part of the formed competencies in the isogress phase, which is determined by an increase in the amount of independent work of the student. Active sub-qualities may be at different stages of formation during different periods of training, which is also visible in the ladder diagram. The resulting model allows us to proceed to the formation of the concept of a methodology for assessing the competence of an environmental designer.

The contribution to the development of the theory lies in the systematization and clarification of the structure of the process of developing the professional competence of an environmental designer. In the future, this model, together with the resulting LSM, will serve as the basis for developing a methodology for assessing the maturity of the environmental designer’s competencies.

The contribution to the development of the methodology is determined by the synthesis of competency and knowledge models of the competency ladder.

The contribution to the development of practice lies in the possibility of improving educational and methodological work taking into account the developed model, in particular, the selection of the content of disciplines and test materials for assessing learning outcomes.

In the next section of the dissertation, the concept of a methodology for assessing the qualifications of environmental designers will be developed, based on what was obtained in the current stage of research.

2.4.3. Principles for ensuring the complexity and productivity of the work of a creative team in the field of environmental design.

At the previous stage of the study, a system of models for the content and process of developing the professional competence of an environmental designer was developed. In the current section of the dissertation, on its basis, principles will be developed to ensure the complexity and productivity of the work of the creative team in the field of environmental design, based on mutual complementarity of individual profiles of professional competence in the “Wheel of balance” of a creative team in the field of environmental design, as part of the mechanism of functioning of the creative environment.

The relevance of this section of the study is determined by the need to improve the performance of creative teams and increase the relevance of design results in the context of the requirements of society and the goals of sustainable development in the field of environmental design.

The scientific problem of the research is seen in the inconsistency of ideas about the role of the environmental designer in the system of design and research activities, as well as the lack of an interdisciplinary approach to solving the problems of creating a favorable environment for life.

The purpose of this section is to develop principles for assessing individual and collective professional competence based on the logical-semantic model and the “ladder of competencies” of the environment designer, which will allow increasing the complexity and productivity of the work of creative teams.

An analysis of the literature identified sources related to practical experience in training designers and experience in creating models and “templates” to improve the quality of project development. Works were used that considered methods for developing and assessing the professional competence of environmental designers, conceptual

models used to improve the effectiveness of design, as well as publications by the author devoted to the results of the previous stages of this research.

Among the works devoted to methods of forming and assessing the professional competence of environmental designers, one should mention the works of N. L. Larionov, I. A. Lvov, dedicated to preparing students for design activities, L. A. Kovaleva, E. A. Gavrilyuk, related to the use of design methods in the development of environmental designers, pedagogical conditions and features of the formation of competence[127], when teaching various disciplines. The development of diagnostic complexes involved in the formation of competencies deserves special attention[128], problems of assessing the professional training of design specialists, empirical experience[129] and principles of developing competencies when preparing a designer at a university[130].

The basis for modeling the "Wheel of Competencies" for an environmental designer was the assumption that the "ideal" environmental designer has a uniformly high level of competency development in all eight areas of the formation of "active qualities" or groups of competencies. At the same time, at different stages of professional development, as well as depending on personal interests and talents, the individual competence profile may deviate to varying degrees from the uniform "wheel". In this case, the formation of a creative team, as well as an individual trajectory for improving the designer's qualifications, can be built on the principle of complementing the "wheel" of competence until approaching the circle, as the ideal of universal interdisciplinary competence of an environmental designer, or strengthening strong qualities that ensure uniqueness and specialization, in depending on the chosen development strategy.

[127] Mikhailova E.V., Andreeva O.P., Akhmetova S.P. Features of the formation of professional competence of designers in higher education // Pedagogy of Art. 2019. No. 2. URL: http://www.art-education.ru/sites/default/files/journal_pdf/mihaylova_andreeva_ahmetova_53-60.pdf (access date: 07.21.2022)

[128] Bakhlova N.A. Formation of professional competencies of future designers on the basis of an interdisciplinary diagnostic complex (in the educational process of a university): dis. ...cand. ped. Sciences: 13.00.08. Kaluga, 2017. 244 p.

[129] Antonenko Yu.S. Analysis of the experience of developing competencies during designer training at a university // Philosophical and pedagogical problems of modern education. 2019. No. 1. P. 216-219.

[130] Davydova E.M., Radchenko V.Yu., Radchenko O.S. Principles of universal design as the basis for the formation of professional competencies of designers // Philological Sciences. Questions of theory and practice. 2016. No. 4 (58). Part 1. pp. 186-190.

The positive effect of developing a methodology for assessing the competence of an environmental designer using the "Wheel of Competence" model lies in the possibility of further development of the proposed principles to increase the complexity and productivity of research and design in environmental design.

The theoretical basis of the study is the synthesis of personality-oriented and competency-based approaches in education[131].

The research methodology was based on the "Concept of an open format for the profile of citizens' competencies, trajectories of their development and procedures for their creation," developed as part of the implementation of the federal project "Personnel for the Digital Economy" of the national program "Digital Economy of the Russian Federation"[132] in combination with a logical-semantic model of the competence of an environment designer and the results of modeling the process of formation and levels of development of competencies performed in the previous sections of the dissertation. To develop the testing concept, the test method and the expert assessment method were used. The interactive model "Balance Wheel" was used as a prototype and analogue of the model being formed.[133], used in business training and coaching self-assessment techniques.

The principle of constructing the "Open format of the citizen competency profile", based on the eight-ray "coordinate system", coincides with the graphic structure of the LSM, which allows us to move from modeling the content of competence to the formation of a methodology for assessing the results of its formation without changing the structure of the model. "The concept of an open format for the profile of citizens' competencies, trajectories of their development and the procedure for their creation" and the interactive

[131] Korsakova E.A. Competence-based approach in the system of continuous art education: from theory to practice // Competence-based approach in the system of continuous art education: theory, practice and prospects: materials of the region. scientific-practical conf. (November 8–9, 2007) Omsk, 2007. Part 1, pp. 92-97.

[132] The concept of an open format for the profile of citizens' competencies, trajectories of their development and the procedure for their creation: Developed as part of the implementation of the federal project "Personnel for the Digital Economy" of the national program "Digital Economy of the Russian Federation" [Electronic resource]. URL: https://digital.gov.ru/uploaded/files/kontseptsiyaotkryitogoformataprofileikompetentsii.pdf (access date: 07/01/2022)

[133] The interactive model "Wheel of Balance" is offered by students of the online program "Manager" by Victoria Shukhat as a tool for self-control and self-motivation in the learning process. (URL: http://www.victoria-training.ru/ (date of access: 09.09.2022)).

model “Wheel of Competencies”, built using a Microsoft Excel table, are taken as the basis for the synthesis of the logical-semantic model and the “Ladder of Competencies of an Environmental Designer”. As part of this synthesis, the LSM is transformed into the “Wheel of Competencies of an Environment Designer”, in which each of the eight rays is presented as a ten-point scale of levels of systemic complexity of the formation of competencies, in accordance with the universal scale of values of the “Ladder of Competence of an Environmental Designer”.

Based on an understanding of the levels of competency development expected at different stages of the “Ladder of Competences,” a testing system has been developed that allows assessing the competency profile of students using two formats: self-assessment and expert assessment. Based on the testing results, an individual competency profile is formed. Overlaying the individual competence profiles of the creative team members on top of each other allows us to consider the collective competence profile (Fig. 20).

In the testing system, the author provides for the possibility of combining self-assessment and expert assessment of the levels of formation of active qualities and competency indicators. As part of the study, a generalized test was developed, including open-ended questions, in response to which it is necessary to reveal the content of the formed “active qualities”, which are assessed by the examiner, and then offers the opportunity for the test taker to independently choose the level of competence formation he has achieved based on the scale of the level of system complexity provided by the “Ladder of environment designer competencies”. The scores corresponding to this scale are transferred to the “Competency Wheel” model. The score assigned by the expert after analyzing the answers to open-ended test questions is also given in the interactive model, which allows you to compare the subject’s self-assessment with the expert assessment. Repeating testing at the next stage of training allows you to visualize the change in the individual competency profile over the training period.

Let’s take a closer look at the testing system, taking into account possible additional tools for expert assessment of the level of competence development.

The first group of competencies, “personal soft-skills”, K-1 in the LSM model, corresponds to the “supra-professional competencies” of the subject: knowledge of oneself, one’s personal qualities and soft skills, readiness for self-organization and professional communication. The open question is formulated as follows:

1. What character traits and “soft skills” influence the work of an environmental designer and how? Which of these skills do you have? To clarify the expert assessment of a detailed answer to this question, it is advisable to use additional psychological tests, for example, the Myers-Briggs typology test[134], the passage of which is mandatory for employment, and others.

Self-assessment of your competencies is provided in the following test question:

2. Rate in points how well you know yourself, your character and your “soft skills”, are you developing them, are you able to use them to achieve your goals? The provided answer options correspond to the scale of the “Ladder of Environmental Designer Competencies”: 1. Unconscious incompetence (I don’t understand myself well, I don’t know how to cope with tasks on time, I don’t know how to fix it). 2. Conscious incompetence (I suffer from procrastination, do not fulfill my own plans, I know that I need to learn to self-organize). 3. Initial knowledge (I have strengths, I know how to use them, I don’t work specially on my character, it’s fine for me. 4. Formation of knowledge (I work on myself, I know how to solve my usual problems, but I don’t have time to do a lot of things, I often end up in a situation of emergency). 5. Formation of skills (I know my strengths and weaknesses, I cope with basic tasks, I want to achieve more, I know how to plan, I engage in self-development). 6. Developed skills (I know my strengths and weaknesses, I can work in a team, help each other achieve common goals, I have my own goals and objectives, I achieve them or plan to achieve them, I engage in self-development, I can teach something to a beginner). 7. Conscious skills (I know my strengths and weaknesses, I engage in self-development, I have the potential to become a leader or mentor, I know how to be a member of a team, achieve common and personal goals, I know time management, I can teach something to a beginner.) 8. Unconscious

134 Test MBTI [electronic resource]. URL: https://4brain.ru/blog/тест-на-тип-личности-маерс-бриггс/ (date of access: 07/25/2022)

competence (I manage to do everything important, plan is normal, I know how to relax, I don't know how to teach this). 9. Conscious competence (I know how to be a team leader, I consciously engage in time management and self-development, at the same time I have time to rest and do not get overwhelmed, I can teach something to a beginner). 10. Conscious competence (I am a successful manager and/or an experienced mentor)

To assess the second group of competencies, artistic and visual, K-2 in the LSM model, the open question is formulated as follows: 3. What artistic and visual skills does an environmental designer need and which of them do you have? There is a choice of answers for self-assessment: 4. How do you rate your artistic and visual skills in points? Possible answers: 1. Unconscious incompetence (can't everyone draw? What laws can there be here?). 2. Conscious incompetence (I can draw something from life, but I don't know the laws of perspective and color). 3. Basic knowledge (I draw nature in a recognizable way, but I violate the laws of perspective, composition and color). 4. Formation of skills (I draw from life in a recognizable way, I see my mistakes, but I cannot correct them myself). 5. Formation of skills (I draw from life in a recognizable way, I see my mistakes, I can correct them if the teacher tells me how). 6. Developed skills (I can draw well from nature; I correct mistakes myself). 7. Conscious skills (I freely depict nature, I break laws consciously if the creative concept requires it, I can draw "from my head" as from life). 8. Unconscious competence (I am a professional artist, participant of exhibitions). 9. Conscious competence (I am a teacher, a member of a creative union, a participant in annual exhibitions). 10. Conscious competence (I am a laureate of competitions and/or have titles and awards).

The test can be supplemented with carefully selected references for self-assessment, in accordance with the stage of training or the expected level of qualifications and creative orientation of the candidate for the position, as well as the creative portfolio of the test taker for expert assessment. In a university setting, learning results in creative disciplines for the last semester can be used.

The open question for the third learning subgoal, design thinking, K-3 in the LSM model, is: 5. What are design-thinking and creativity for you? How are they related to each other? Why does a designer need these tools? The answer to the open question of

the test can be supplemented by including in the test small practical tasks that allow you to apply design thinking using an example, and also take into account the manifestation of design thinking in the coursework of the test taker in a university setting. Self-Assessment Question: 6. How do you rate your design thinking and creativity skills? Answer options: 1. Unconscious incompetence (this is the first time I've heard these words, what is it?!) 2. Conscious incompetence (I know these words... but I don't have such skills) 3. Basic knowledge (I'm starting to study this topic and examples of application) 4. formation of skills (sometimes I try to use them in projects) 5. Formation of skills (consciously using design thinking when designing, developing creativity) 6. Formed skills (I like these tools, they help me improve projects) 7. Conscious skills (for me it is natural to use these tools when designing and analyzing) 8. Unconscious competence or "mastery" (I am a professional designer/architect but I do not consciously use these tools, we were not taught that way) 9. Conscious competence (I am a professional designer and I consciously use these tools) 9. Conscious competence (I am a professional designer and I consciously use these tools) 10. Conscious competence (I teach design thinking and creative techniques to designers).

Assessment of design competencies, K-4 in the LSM model, is based on an open-ended test question: 7. How does architectural design differ from artistic and visual skills? Why does it serve an environmental designer? What does a designer need to know? Options for answering the self-assessment question: 8. Rate your design competencies in points, organized similarly to the previous sections of the test, formed similarly to the previous sections of the test. The full version of the test is given in Appendix 2 to the dissertation. It is recommended to clarify the expert assessment of the answer to an open question with the help of references for analysis and a portfolio of the subject's projects for expert assessment. If there is a probationary period upon hiring, practical assignments are given. At the end of the test, it will be possible to compare self-esteem and the results of the probationary period. In a university setting, the results of an intermediate or final certification in the relevant discipline or diploma design can be used.

The assessment of sociocultural competencies, K-5 in the LSM model, is based on an open-ended test question: 9. Sociocultural and spiritual-moral competencies, legal

culture - what is it, and how is it related to environmental design? Question for self-assessment: 10. Rate in points the level of development of your sociocultural competencies. For expert assessment of sociocultural, spiritual, moral and legal competencies, you can use detailed tests, both with the possibility of choosing the correct answer in the field of history or legal foundations of professional activity, and with "recognition" of visual materials from the history of architecture and art, taking into account the expected for the period of training of knowledge in this field or the specific training required for a particular position for which competition is held through testing.

The development of competencies in the next group, information technology, K-6 in the LSM model, can be fully verified only during the trial period, however, it is also possible to develop a more detailed test or issue test items. However, an open-ended question for a detailed answer also gives an idea of the subject's preparedness: 11. Information technology competencies: what is this for an environmental designer? How does digitalization affect environmental design? The choice of self-assessment is provided by the question: 12. Assess the maturity of your information technology competencies in points. When assessed during the training period, as a rule, the expected level of development of competencies in this area is quite accurately determined by the program, and when hiring - by the job description, and its assessment does not cause difficulties.

Testing research competencies, K-7 in the LSM model, is based on an open-ended test question: 13. Why and what research competencies does an environmental designer need? A detailed answer to it allows one to draw fairly correct conclusions about the subject's preparation. The question can be supplemented with clarifying questions about the essence, methods and forms of scientific work, links to articles for analysis as part of the test, or a review of the subject's own scientific works, as well as studies studied by him over the past six months, which the subject considers most significant for the development of his competence. Question for choosing self-assessment: 14. Rate the level of your research competencies in points.

The final "wheel" group of competencies, technical and economic, K-8 in the LSM model, is based on an open test question: 15. What technical and economic competencies

should an environmental designer possess and why? The answer to this question can also be more carefully checked using additional test items or practical tasks, the content and level of difficulty of which should correspond to the period of study or the requirements of the position. It is advisable to provide the test with a transition from the level selected during self-assessment to the corresponding test materials. Question for self-assessment: 16. Rate your competence in the technical and economic field of environmental design, as in other sections, provides for choosing an answer option in points, with a decoding of its value in accordance with the “Ladder of Competencies of an Environmental Designer”

Detailed answers to open-ended questions of the test, in comparison with self-assessment, allow one to draw quite meaningful conclusions to assess the prospects of working with the test taker, therefore, despite the given options for clarifying the test, one should not underestimate the simplified version of testing, the value of which is associated with the speed and ease of implementation , in contrast to possible detailed options, which can take several days or weeks, taking into account all possible tests. Such a system can be developed based on the proposed concept when refined to a professional standard and “qualification framework” for environmental designers. It is important to understand that specific facts can be forgotten, and skills can be mastered at the level of “unconscious competence”, when they are easy to apply, but difficult to explain. At the same time, correct ideas about the field of knowledge as a whole create a reliable basis for increasing competence, self-learning and professional communication. Visualization of the “individual competence profile” invites the designer to think about the prospects for his further professional growth, and the formed “collective competence profile” of the creative team, identifying a lack of competence in any part of the professional sphere, with the subsequent selection or development of personnel in this area, can become an effective tool for the formation of creative teams in environmental design and the development of a personnel assessment system.

Thus, a system has been developed for assessing the conformity of the level of formation of professional competence using testing and an interactive model “Wheel of Competencies of an Environmental Designer”, which includes differentiated assessments of the levels of formation of active qualities of competencies, as subgoals of training, for

each of the 8 areas of LSM competence of an environmental designer. Combining the levels of formation of active qualities of competencies in each area allows you to build an individual competence profile. Combining individual profiles according to the principle of mutual complementarity allows us to form a competent creative team, which allows us to ensure the principle of its compliance with the requirements of balance and productivity. The condition for the effectiveness of the work of the creative team is a high level of development of supra-professional communication skills and sociocultural / spiritual and moral competencies of all participants.

The positive effect lies in the possibility of using the resulting concept to improve processes and evaluate the results of training in environmental design, as well as the development of a professional standard and qualification framework.

The contribution to the development of the theory lies in identifying the importance of the personal aspect and supra-professional skills, taking into account the possibility of an individual trajectory and profile for the formation of professional competence and career, as well as in the formation of creative teams.

The contribution to the development of the methodology lies in the idea of visualizing the wheel of competencies of a creative team, which was not presented in the original methodology for constructing a free profile of citizens' competencies.

The contribution to the development of practice lies in the possibility of comparing the individual competency profile of a designer, applicant for a position in the project team, with the wheel of competencies of the existing team, for its optimal development, planning staff development in the interests of harmonizing the collective competency profile.

Conclusions on the second chapter

1. As a result of the study of the phenomenon of the creative environment and the mechanism of its functioning, in combination with a system of models of professional competence of the environment designer and the process of its formation, the main aspects of the conditions and process of formation, as well as the "active qualities" of the

competencies of the environment designer in the context of the synthetic concept of environment design, were identified, clarified content of training and the essence of the expected levels of competencies at various stages of training and professional development.

2. A system of models has been developed that represents the conditions and process of competence formation as a non-linear evolutionary process, depending both on the educational environment, content and training plan, and on the individual characteristics of the student, which determines the need to combine a competence-based approach with a person-oriented training system that can be implemented within the framework of teamwork, based on the formation of a competent creative team in a creative environment.

In the next chapter of the dissertation, an empirical study will be carried out on the practical use of the results obtained in the first two chapters of the dissertation, using the example of the implementation of the main educational program “Environmental Design” at St. Petersburg State University and a number of projects developed by students.

CHAPTER 3. RESEARCH AND CREATIVE ACTIVITIES BASED ON THE SYNTHETIC CONCEPT OF ENVIRONMENTAL DESIGN

Chapter 3 of the dissertation is devoted to the empirical experience of using the results of theoretical sections of the study in the practice of research, methodological and creative activities of environmental designers, using the example of the implementation of the educational program "Environmental Design" at St. Petersburg State University.

3.1. Using a system of models of the synthetic concept of environmental design in the practice of research and project development in Environmental Design

In the first chapter of the dissertation, the author proposed a system of conceptual models reflecting the theoretical foundations of environmental design, models of goals and boundaries of environmental design, taking into account the factors of comfort and creativity, as tools for designing and developing the professional competence of an environmental designer, the content of which was revealed in more detail in the second chapter research. The current section of the study will provide empirical experience and the potential for using the resulting models in the process of creating environmental design projects.

In this section of the study, the experience of analyzing and creating projects based on the developed models is considered primarily as a "Product" in the categories of creativity theory, since it is this category that determines the strategic goal of the entire study, namely, improving the quality of projects in environmental design based on synthetic environment design concept. In addition, examples of analogues of the planned "Product" are part of "Element-1" in the formation of the Creative Environment, according to the model of the mechanism of its functioning proposed in the fourth paragraph of the first chapter of the dissertation.

The problem of the research is to test a system of models of the theoretical foundations of environmental design as a research and design tool in environmental design, from the point of view of methodological support for the creative “Process”.

The research hypothesis is that the development and analysis of projects using conceptual models of the theoretical foundations of environmental design can help increase the complexity, consistency and interdisciplinarity of the development of a project as a creative “Product” in the context of the convergence of science and art, allowing the development of scientifically based project proposals with greater consistency and completeness than with conventional approaches to design that do not use scientific methods in combination with creative ones.

The objective of this stage of empirical research is the practical application of conceptual models of the theoretical foundations of environmental design within the framework of design research and project development and the creation of “cases” of their use in design and research activities as a methodological guide for environmental designers.

The positive effect of the research is that the “cases” developed during the experiments illustrate the principles of using the resulting tools, and also allow us to assess the potential for increasing the complexity and scientific validity of project proposals.

The main theoretical principles on which the current stage of the study is based are obtained in the results of the first and second chapters of the study.

As a basic methodological approach and scientific method, an experimental study was used based on the use of models of content and conceptual apparatus of the subject area of environmental design, as well as a matrix of comfort and creativity of the environment, to analyze the content of already completed final scientific and creative projects of graduates of the educational program “Environmental Design” of St. Petersburg State University or work in progress.

According to the developed research program, the basis of this stage was the analysis of projects of graduates of the “Environmental Design” program at St. Petersburg State University using the conceptual models of the theoretical foundations of

environmental design proposed at the previous stage, as well as participant observation of the experience of using the model system by students in the process of their work.

Based on a number of works, their results were compared with conceptual models of the content of environmental design, the conceptual apparatus of the subject area of environmental design, as well as with the “design code matrix” of environmental comfort and creativity. As part of the experiment, a number of final qualifying works of bachelors and masters of environmental design, who received “good” and “excellent” grades at the defense of the thesis, were considered as “cases” of the practical application of conceptual models and descriptions of the analysis methodology and possible results of its implementation, practical recommendations were given on the use of the proposed models in design research. The objective of the analysis was to identify the potential for increasing the level of complexity and interdisciplinarity of the consideration of the problems posed in the works and the proposed solutions through the use of a system of conceptual models of the theoretical foundations of environmental design.

As part of the analysis, the following results were obtained:

- the potential for increasing the interdisciplinary complexity of considering problems and proposing their solutions using models has been confirmed,

- the potential for increasing the effectiveness of work on the research and project concept has been confirmed.

Let's look at examples of “cases” and recommendations developed by the author as part of an experimental analysis. The examples are grouped in accordance with the models used for analysis, proposed in the first chapter of the dissertation.

3.1.1. Environment design content model.

Sustainable development goals and the contradictions on the way to achieving them often become sources of inspiration for creative ideas and form the basis of the synthetic concept of environmental design as an interdisciplinary art. To identify and analyze such contradictions, our study has developed a model based on the categorical-symbolic method “Hexagram” (P.1.1.), which allows us to first identify the main conflict that arises between two opposing forces in it, and then, through a description of each them, using a triad of key concepts, move on to detailing the internal vectors of tension of this conflict

and the emerging options for choosing design solutions necessary to create a project proposal[135].

The basic conceptual model of the content of environmental design developed using this method considers the “Vitruvian triad” and the “sustainable development triad” as two opposing forces, and finding a balance between them is considered as the content of environmental design as an interdisciplinary art. However, for each specific project, triads can be formed from narrower concepts, depending on the key tasks and obstacles facing the environmental designer. It is assumed that such a technique can help identify creative solutions that meet the aspects of the assigned design and research task identified with its help.

The current section of the study presents some examples of analysis of projects carried out under the guidance or consultation of the author of the dissertation, in which analysis based on the content model of environmental design could help identify additional aspects of the problems posed, as well as expand and justify the proposed design solutions.

The first example is devoted to the creation of a concept for the restoration and development of the Papula rock landscape park in Vyborg[136] (Fig. 22). Despite its historical and natural value, the park on Mount Papula in Vyborg is relatively little used and not properly maintained, unable to compete with the nearby Mon Repos Park. The goal of the work was its development as an alternative recreational destination for residents and guests of the city of Vyborg, offering other types of recreation than Mon Repos Park, which is overloaded with tourists and suffers from vandalism from overly active categories of visitors.

The collection and analysis of initial design data by the author was lengthy and difficult. Attempts to find solutions to the problem of park degradation by means of

[135] Petrashen E.P. Modeling the content and conceptual apparatus of the subject area “environmental design” as an object of study in the educational process // Art education and science. 2022. No. 3 (32). pp. 66-76.

[136] Kosarev V.G. Historical landscape park Papula in Vyborg. Concept of restoration and development: master's degree in design, educational program "Environmental Design". St. Petersburg: St. Petersburg State University, 2022. / Rated “excellent”, noted by the State Examination Committee for relevant topics, recommended for implementation. Scientific supervisor: Speranskaya V.S., Ph.D., prof.
Consultant: Petrashen E.P., Senior lecturer, manager of "Environmental Design" degree prog., Department of Design, St. Petersburg State University.

environmental design occurred without a specific system, which slowed down the development of the project and required the formulation and testing of various hypotheses by trial and error. Let's consider how in this case the content model of environmental design using the Hexagram method could be used.

As a result of the analysis using the “Hexagram” model, three key tasks for the restoration and development of the park could be identified, as a triad of the creative direction of the project: preserving the cultural heritage object (strength), creating scenarios for its use (benefits), identifying the value of the object (beauty), to attract interest and funding. As an opposing triad, three key problems of the park should be identified, for example: loss of infrastructure (social sphere), lack of care (economic sphere), violation of the integrity and connectivity of the territory (ecological sphere) (Fig. 23).

When analyzing the resulting conceptual model in order to select directions for finding solutions for project development, the vectors connecting the vertices of a hexogram formed by two triangles along the diagonals and along the perimeter are considered (Fig. 24):

1. Preservation of a cultural heritage site (strength) – Loss of infrastructure (social sphere). Solution: restoration of historical routes and objects.

2. Creating use cases (benefits) – Lack of support (economics). Solution: creating conditions for economic activity of commercial service establishments in the park.

3. Creation of value (beauty) – Violation of the integrity of the territory (ecological sphere). Solution: realize the potential for creating additional diversity in user experience, as an attractive factor, by identifying the characteristics of the resulting zones and restoring the connection between them.

4. Violation of the integrity of the territory (ecological sphere) – Creation of use scenarios (benefits). Solution: identification of the functional specifics of two separated territories.

5. Creation of use cases (benefits) – Loss of infrastructure (social sphere). Solution: creation of service and leisure facilities in the park.

6. Loss of infrastructure (social sphere) – Creation of value (beauty) Solution: restoration of the lost architectural objects of the park.

7. Creation of value (beauty) – Lack of support (economic sphere). Solution: creation of commercial facilities in the restored architectural objects of the park.

8. Lack of support (economic sphere) – Preservation of the cultural heritage site (strength). Solution: raising funds for the restoration, development and maintenance of the park, by creating an economic model for its functioning.

9. Preservation of a cultural and natural heritage site – Violation of the integrity of the territory (ecological sphere). Solution: restore connectivity and circulation for all users through bridges, including allowing for animal migration.

The key solution of the project developed by the author was the restoration of the territorial connectivity of the park by creating air crossings over the highway that cut it into two parts in 2016, which will make it possible to restore pedestrian accessibility of the active recreation area for walkers in the protected landscape of the landscape zone and restore part of the lost road and path networks. At the same time, the project partially reveals the uniqueness of each of the two parts of the park. The restoration of lost architectural and compositional accents and the creation of new viewing platforms in the project provided visual, emotional and functional content for recreation scenarios and made it possible to supplement the park infrastructure with the necessary service elements to increase the comfort and economic sustainability of the facility.

Unfortunately, the project failed to adequately reflect aspects of the operation and development of the park after its restoration, since the natural, environmental and economic issues that arise when modeling the content of the project using the Hexagram method were not identified and developed.

Nevertheless, the project received an “excellent” rating and approval from the State Examination Committee, due to its high relevance, depth and quality of development. Using the model could make the work more methodical and comprehensive, reduce tension and stress during development, save time on finding solutions, and allocate sufficient time for high-quality graphic execution of the project, which the author did not have enough time to finalize to the intended level.

The second example of using the model is associated with an object located in China, in the city of Wuhan[137] (Fig. 25). The territory of the developed quarry near the city of Wuhan requires reclamation and integration into the life of the city and its ecological framework, but its rehabilitation is costly and labor-intensive.

The problem with the development of this master's thesis was the author's misunderstanding of the need and methodology for scientific substantiation of his proposal to create a botanical garden on the territory of the quarry. As a result of difficulties with organizing the logic of the research and scientific substantiation of the idea, the work took three years instead of the two provided for by the master's program.

As a result of the analysis of the research conducted and the developed project using the environmental design content model using the “Hexagram” method, the potential for substantiating and finalizing the author’s hypothesis about the creation of a botanical garden in a former quarry using this model was identified.

Using the “Hexagram” model, already at the initial stage of work, three key tasks of quarry reclamation could be identified: landscape regeneration (strength), development of the city’s recreational framework (benefits), creation of object value (beauty), to attract interest and funding. As a triad of obstacles, three key problems of the object could be identified, for example: disturbed terrain as a source of increased danger (social sphere), unused territory in the city = lost profits (economic sphere), destroyed ecosystem of the territory (ecological sphere) (Fig. 26).

Thus, based on the project content model using the Hexagram method, nine areas of project development can be identified (Fig. 27):

1. Task: landscape regeneration (Strength) – Problem: disturbed terrain as a source of increased danger (Social sphere). Solution: creating routes, taking into account the features of the terrain and the choice of technologies to strengthen it.

[137] Li Chunliang. An integrated approach to the rehabilitation of an abandoned quarry in Wuhan, China: master's degree in design, educational program "Environmental Design". St. Petersburg: St. Petersburg State University, 2022. / Rated “excellent”, noted by the State Examination Committee as a project completed at a high professional level, approved by the State Examination Committee, recommendation for publication. Scientific supervisor: Petrashen E.P., Art. teacher, director OOP "Environmental Design", Department of Design, St. Petersburg State University.

2. Task: development of a green frame of the city (Benefit) – Problem: unused territory in the city leading to losses (Economic sphere). Solution: creation of an economically viable facility.

3. Challenge: value creation (Beauty) – Challenge: destroyed ecosystem (Ecological domain). Solution: scenarios based on restoration of biodiversity and landscape diversity.

4. Problem: destroyed ecosystem (Ecological sphere) – Task: development of a green frame of the city (Benefit). Solution: selection of an assortment of plants, taking into account the characteristics of the microclimate and hydrology of the quarry.

5. Development of a green frame of the city (Benefit) – Relief as a source of increased danger (Social sphere). Solution: Water management, geoplastics.

6. Relief as a source of increased danger (Social sphere) – Creation of value (Beauty). Solution: Selection of optimal reclamation methods that ensure landscape diversity and safety.

7. Creation of value (Beauty) – Unused territory in the city as lost profit = losses (Economic sphere). Solution: identifying the unique potential of the territory for its use, taking into account the economic aspect of development.

8. Unused territory in the city = losses (Economic sphere) – Landscape regeneration (Strength). Solution: reclamation within the framework of the National Project of the People's Republic of China "Development of Botanical Gardens"

9. Landscape regeneration (Strength) – Destroyed ecosystem (Ecological sphere) Solution: Taking into account the microclimate, soil restoration, selection of plants from different climatic zones of China, in accordance with the microclimatic conditions of the quarry.

Thus, all the contradictions of the object are resolved, namely, additional resources are attracted for its creation and maintenance, both in the economic, environmental and socio-cultural aspects, since for the creation of botanical gardens in China there are special funding opportunities that would not be possible attract when choosing a different method of reclamation of the quarry, the garden will become part of the green belt of the city, which will compensate for the environmental damage caused by the development of

the quarry, and in addition, the botanical garden will allow for scientific, cultural and educational work, which will provide social benefits in the long term.

The use of a model using the “Hexagram” method could significantly speed up the search for arguments to substantiate the proposal to create a Botanical Garden as a hypothesis that arose under the impression of studying some analogues, as well as due to the author’s interest in the National Project for the creation of Botanical Gardens in China.

The examples given show that the developed methodology allows us to systematize and facilitate the search stage of the research, accelerate the identification of key contradictions, the solution of which can form the basis of the project, help formulate or substantiate a hypothesis, and set the goals and objectives of research and design.

The model of the conceptual apparatus of environmental design is recommended to be used as a continuation of the analysis obtained using the first method, especially in cases of difficulties with building the logic of work, due to the need to take into account a large number of aspects of the project hypothesis, compared with the architectural formula, and obstacles to its implementation, correlated with the triad of sustainable development. With this approach, the opportunity is used to develop a system of principles or aspects of the project, taking into account the hierarchical structure of the stages of its development, from general to specific.

3.1.2. Conceptual apparatus of the subject area of environmental design.

For the development of cases, projects were selected that were in the process of development in the 2022-2023 academic year as part of the preparation of the thesis for the 2nd year master's degree students of the OOP "Environmental Design" of St. Petersburg State University. The effect of using models directly in developing project concepts has been demonstrated.

One of the projects is dedicated to the formation of the therapeutic landscape of an orthopedic clinic. As part of the research, the master's student collected a significant amount of material about the principles of therapeutic design, its application in medical institutions, as well as about the design object itself. However, the development of options and the selection of specific solutions for their development in the design part of the work caused significant difficulties. In this situation, the student was asked to use a new

analysis technique. At the first stage, using the environmental design content model using the Hexagram method, the student structured the hypothesis of the design proposal, highlighting answers to key questions about “what?”, “how?” and for what?" planned to be developed in the project, and also identified the main obstacles that need to be taken into account in it. The “stress vectors” obtained in the model made it possible to formulate the main directions for further work (Fig. 28).

Based on the received context, at the second stage of analysis using conceptual models, the student used a model of the conceptual apparatus of the environmental design subject area, developed using the method of two-level triadic decoding of concepts. In developing a version of the model for his project, the triad of the design hypothesis from the previous model was taken as a basis, and the context obtained in it was used for the triadic decoding of key concepts at the second level. Thus, the directions for project development were clarified and transformed into a specific nine-point project work plan. Each of these points subsequently received an additional description corresponding to the selected design solutions (Fig. 29, 30).

The next project is devoted to the development of a concept for reorganizing the environment of an existing hotel complex in China, which has significant landscape areas. The goal of the project is to identify such principles of environmental design, when used, the landscape part of the complex will receive additional value, allowing to improve the quality of its maintenance due to additional profit.

As part of the consistent application of the “hexagram” method and two-level triadic decoding, a triad of research hypotheses was formulated, on the basis of which nine principles for reorganizing the environment of a given landscape were obtained. To detail them, an additional, third, level of decryption was used. As a result, a 27-point project work plan was obtained (Fig. 31, 32, 33).

In both of these examples, the use of models significantly facilitated the process of communication between the author and the project manager, and allowed the work to be completed on time, despite the lag behind the schedule, which was noted during the interim certification.

3.1.3. "Design code matrix" for the comfort and creativity of the environment.

To test the applicability of models of contradictions in environmental design and the "Design Code Matrix" obtained on their basis in practice, on its basis an analysis was carried out of the joint final creative project of bachelors of environmental design A.V. Kiseleva[138] and A.V. Murina[139] on the topic of reorganizing the environment of the St. Petersburg State University campus in Peterhof (Fig. 34).

The history of the emergence and formation of the campus is full of contradictions and dramatic turns. Among them, one can distinguish both "evolutionary" and "revolutionary" stages, periods of rise and decline of development concepts. Currently, many of its components are characterized by a depressive state caused by unfavorable historical, economic and urban development circumstances. Nevertheless, the entire complex is an interesting space, both real and virtual, with significant potential for development and transformation. It is this potential that has become one of the popular objects of research and creative interventions for students of the Main Educational Program "Environmental Design" of St. Petersburg State University.

As part of their training and qualifying work, students not only get acquainted with the history of the formation of the campus and conduct a comparative analysis of the project and its implemented part, but also formulate proposals for the modern development of cluster elements, solving its environmental and functional problems.

Among the possible solutions, proposals have already been developed to improve the comfort of the campus environment, reconstruct, modernize and increase the usable area of the Palace of Culture and Science, and construct new buildings for the Faculty of Biology, compacting the campus development. One of the works presents proposals for the improvement and landscape design of the Universitetsky Prospekt boulevard, renovation of the facades and courtyard spaces of the faculty buildings and the canteen.

[138] Kiseleva A.V. Concept of modernization of the Peterhof campus of St. Petersburg State University: Bachelor of Design. St. Petersburg: St. Petersburg State University, 2021.
Supervisor: Petrashen E.P. (URL: http://hdl.handle.net/11701/30445 (access date 05/20/2023))

[139] Murina A.V. Concept of modernization of the Peterhof campus of St. Petersburg State University: Bachelor of Design. St. Petersburg: St. Petersburg State University, 2021.
Supervisor: Petrashen E.P. (URL: http://hdl.handle.net/11701/30445 (access date 05/20/2023))

As part of the design, students studied the problems and potential of campus development as an underappreciated alternative to the construction of another new University campus planned in Shushary. It should be mentioned that since 2013, students of the “Environmental Design” program at St. Petersburg State University have already completed several proposals within the framework of this topic. Among them are two new buildings for the Faculty of Biology, the reconstruction of the House of Culture and Science, and the improvement of recreational areas for the Faculty of Physics and Mathematics. On the initiative of A. Kiseleva and A. Murina, all previous works devoted to different parts of the territory were collected into a single master plan and supplemented with a number of new proposals. In particular, new architectural objects were proposed to complement the existing complex to the required completeness, as well as to increase the educational, scientific and production potential of the campus. In addition, the project proposes a landscape improvement concept that provides variable leisure scenarios and transit routes for various target groups, including students and teachers of different faculties, taking into account the creation of universal “university” and personal “faculty” spaces, places for recreation and walks, and also outdoor studies. It also provides for the formation of a reclamation system to manage surface runoff and restore the watershed for the campus-connected hydraulic system of the Sergievka Estate Park. In general, the project proposes the formation of a modern campus aesthetic that corresponds to the status of St. Petersburg State University and meets the objectives of the St. Petersburg State University development program. An assessment of the proposed solutions, as well as a pre-project assessment of the quality of the campus environment, are noted on the “comfort matrix” using the example of the concept of A. Kiseleva and A. Murina, taking into account the developments included in it by A. Koleganova, E. Byzova, A. Kurochkina, M. Kuznetsova. (Table 5, 6).

The resulting “design code matrix” clearly demonstrates the improvement in the quality of the campus environment according to 10 pairs of generalized factors of comfort and creativity, creating conditions for both active and reactive scenarios of user behavior from different target groups of the project and behavioral types according to the DISC method. This analysis can be carried out both during and after the project, or as part of a

comparative assessment before and after occupancy. Assessments can be obtained in the form of a user survey and be quite subjective, however, their spread within the proposed boundaries, taking into account the homeostatic nature of the contradiction, should not lead to significant disagreements, in contrast to the assessment of proposals as appropriate or inappropriate, comfortable or uncomfortable. Specific criteria and assessment methods can be developed for a specific project, taking into account its specifics, based on a pre-project analysis of the object, which will facilitate the further search for a balance of unique and universal aspects and the discussion of design solutions with all target groups.

The presented example of using the "design code matrix" of the environment and deciphering the values of the proposed assessments gives an idea of how the resulting tool helps to detail subjective ideas about the comfort or discomfort of the environment, formulate the goal and objectives of the project, based on the factors of comfort and creativity, and facilitate the collection of information for pre-project analysis and evaluation of proposed solutions.

Unlike traditionally used SWOT analysis[140], which was developed for economic science, but is actively used in design research, the "Design Code Matrix" contains more accurate "tips" that help identify the characteristics of an object that are significant for the project and outline design goals and objectives. In addition, the "matrix" can become the basis for the formation of surveys to identify users' assessment of an object, followed by generalization and systematization of data, which suggests the effectiveness of its use, both in research and in real design practice.

Thus, in the current section of the study, experience in using a system of models of a synthetic concept of environmental design is obtained and described using the example of the development and analysis of final qualifying works prepared by students of the Environmental Design program at St. Petersburg State University. Based on the results of the study, a conclusion was made about the advisability of using these models as elements of methodological support for design and analysis in environmental design. Examples or "cases" have been developed for the use of models in environmental design.

[140] Starshinova T. A. SWOT analysis: methodology // Bulletin of Tver State University. Series: Economics and management. 2020. No. 4 (52). pp. 62-71.

The advantage of using models is to increase the clarity, consistency and detail of the analysis based on them both at the development stage and at the stage of project evaluation, in comparison with the method of successive approximations and SWOT analysis, the method of generating and selecting options used previously. The novelty of the approach is determined by the possibility of using both the entire complex of models and individual models to increase productivity in generating ideas and the complexity of project development.

Considering the project as the “Product” category in this study allows us to move to the “Press” category as the main factor of Element-1 of the mechanism of functioning of the creative environment, which may include analogues of the Product to facilitate setting and visualizing the goal of the creative process and stimulating creativity.

The contribution of the result of this section of the study to the development of theory is to deepen the understanding of the system of models of the synthetic concept of environmental design and their significance in environmental design, thanks to the description and analysis of examples (cases) of their use in design and research activities.

The contribution to the development of the methodology lies in identifying the stages of project development at which the use of models significantly facilitates and accelerates the further development of the project.

The contribution to the development of practice lies in confirming the hypothesis about the advisability of using the developed models in practical work to improve the quality of projects in environmental design.

The validity and reliability of the results obtained is ensured by the design of the experiment, feedback from students after getting acquainted with the proposed models and cases of their use, as well as feedback from the expert community when testing the results at conferences.

The experience gained confirms the hypotheses put forward when developing models based on bibliographic research and categorical-systemic methodology.

Currently, analysis based on the proposed models is used in a number of new master's studies and when teaching master's students methods of scientific research,

which significantly increases the efficiency and complexity of work on them, and also facilitates communication between teachers and students.

A useful effect of using the methodology is the identification of areas of research that are beyond the competence of the authors, which requires either advanced training or the involvement of external expertise, which ensures a higher level of design than without using a system of models of a synthetic concept of environmental design.

The significance of the research and experimental results is determined by the theoretical validity of the developed models and the high heuristic nature of their use, confirmed in practice. The scientific novelty of the results is due to the fact that the development of such a system of models and their practical use was carried out for the first time.

The scope of application of the results is design and research activities, as well as educational activities in the field of environmental design, architecture, landscape architecture, town planning and urban planning, including higher education, additional professional education and advanced training.

Prospects for further research include clarifying algorithms for assessing the factors of comfort and creativity of the environment, expanding the experience of their practical application.

3.2. Experience in the formation and use of a creative environment using the example of projects of the educational program “Environmental Design” of St. Petersburg State University

At the previous stage of the study, an analysis of projects was carried out using a system of models of a synthetic concept of environmental design to increase complexity and logical coherence as indicators of the quality of project development as a “Product” of research and creative activity. The current section of the dissertation will examine the influence of a special architectural and spatial environment as the “Press” factor of Element-1 of the creative environment functioning model on increasing the effectiveness and efficiency of this process.

The problem of this section of the study is the formation of experience and "cases" of creating the effect of a creative environment based on various architectural, spatial and environmental conditions, due to the insufficient development of methods for the complex formation of a creative environment, in particular, using the potential of architectural, historical and/or natural environment for the development of creativity and professional competence of environmental designers.

The relevance of this stage of the study is determined by the need to supplement the theoretical model of the mechanism of functioning of the creative environment with examples of its practical use and recommendations for its creation, based on the experience gained.

The creative environment has been studied in a significant number of scientific works, but the author has not identified its component analysis and evidence-based techniques for developing creativity based on the "4Ps." "For the manifestation of creative abilities, a unique environment is required - a creative environment"[141]. This thesis by Yu.L. Starenchenko became the starting point for the author to study the phenomenon of the creative environment and the principles of its organization and functioning. First of all, the famous artist colonies and residences of artists that appeared at the turn of the 19th and 20th centuries were considered as examples of a creative environment[142]. The reason for the research was the search for ideas for creating a concept for a new use of the complex of dachas of the former village of Bobylskaya in Peterhof, the most significant of which, from the point of view of architectural and historical and cultural value, is the dacha of M.N. Benois, the only one preserved from the whole ensemble of family dachas of this famous artistic dynasty.

The study was based on an analysis of environmental factors that influenced the formation of art colonies and residences of artists, discussed in Section 2.1. dissertation, since the very appearance of the dachas of the Benois family was due to the choice of a

[141] Starenchenko Yu.L. Psychology of mass communication: educational method. allowance. SPb.: SPbSUT. Part 1: Diagnosis and activation of creative abilities. 2002. P. 13.

[142] Petrashen, E.P. Creative environment. The phenomenon of artist colonies, dachas and estates of cultural figures / E.P. Petrashen // Sat. report All-Russian conf. "Problems of reconstruction and restoration of monuments of historical and cultural significance." – St. Petersburg: St. Petersburg State University Publishing House, 2011. – P. 102-106.

place for his recreation and creativity by the artist Albert Benois, and subsequently, the dachas became an important center of attraction for contemporaries, representatives of various arts and creative movements, which allows them to be compared with colonies of artists and the like residences.

The hypothesis of this stage of the study is the assumption that the architectural and spatial environment, contrasting to the familiar everyday environment, having the potential for transformation or imaginative interpretation, or transformed and storing the history of transformations, in combination with examples of environmental revitalization projects, creates conditions for stimulating creativity and development of professional competence of future environmental designers.

The objective of the empirical research is to describe examples of the use of this factor to reveal the creative potential of students within the framework of the implementation of the “Environmental Design” program at St. Petersburg State University and/or other participants in similar experiments, to generalize the experience of the influence of a special spatial environment and its content with analogues of the planned “Product”, as factors “ Press" and "Product" of Element-1 of the model of the mechanism of functioning of the creative environment. It should be noted that it is impossible to exclude a special course of the creative and educational “Process”, as well as the inclusion of new “Personas” in unusual conditions. In this regard, in this section we will consider examples where the role of the material environment is assessed as leading, while the modeling of the process was not given special attention, compared to the usual one, and it changed spontaneously, under the influence of conditions, and not purposefully.

The development of examples of the formation of a creative environment based on variants of the architectural and spatial situation in the context of its functioning model will allow us to move on to the consideration of Element-2 of the model, which includes the Process and the Person.

The main theoretical principles on which the current stage of the research is based, as well as basic methodological approaches and scientific methods are described in the previous chapters of the dissertation.

Based on the theory of creativity, a model of the mechanism of functioning of the creative environment was developed using the “simple compensation homeostat” method, which allows us to visualize the principle of the influence of the environment on the “Person” through the simultaneous influence of four active factors of creativity, grouped into two elements of the system: Element-1, representing the material environment and Element-2, representing the totality of participants in the interaction process and its scenario. Element-1 is formed by the categories “Press” and “Product”, while “Product” is a kind of “key” for the perception and interpretation of “Press”.

The current section of the study examines design experience in conditions of close interaction with various environmental objects as part of the architectural and spatial complex of St. Petersburg State University and some others, as the basis for creating the effect of a creative environment in the creative and, at the same time, educational process. As part of their training and work on projects, students become acquainted with the history and practice of using such objects, conduct a comparative analysis of its project, if any, and its implemented part, examples of analogues. Then proposals are formed for the modern development of the object or its elements, and for solving its environmental and functional problems.

As a result of a series of experiments and observations of students’ work when developing projects in standard learning conditions (home-university) and using a creative environment (home-university-creative environment), through testing, it was found that the second approach forms competencies at a higher level, significantly increases motivation, creates conditions for the manifestation of personal orientation and the disclosure of the student’s creative potential. Examples of test results are given in the fourth paragraph of this chapter of the dissertation.

As a first example, it is proposed to consider the experience of A.O. Kuzmina’s master’s research, dedicated to the Glebuchev ravine in Saratov, as a result of which a joint article was published with the master’s supervisors, including the author of this

study[143]. An important role in creating the concept of environmental design in this work was played by the master's student's personal experience of destructive space in the urban environment and her vision of the potential of this part of the urban environment for development, for which a convincing scientific justification was found: "in the age of high technology, human needs for interaction with "wild urbanism", the desire to be in a natural environment without leaving the urban environment. Saratov is a city whose historical center is distinguished by a high concentration of architectural and sculpture monuments, advertising information, shop windows, bright flower beds and flower beds, navigation and road signs. All this increases tension in the perception of space. That is why the idea arose to give city dwellers the opportunity to contemplate nature, preserving the current contrast between the urban environment and the space of the ravine, but giving it a new quality of a linear landscape park with the functions of a recreational and cultural center. In developing the proposed concept, the designer (landscape architect) is faced with the task not of stylizing nature, but of creating conditions for its revival and restoration. The designer must become a tool in the hands of nature, and not vice versa. To do this, when further developing the project, it is necessary to focus on how nature naturally lives and develops."[144]. Based on qualimetric methodology[145], in accordance with the concept of sustainable development and the ideas of forming water-green frames of cities, both full-scale and sociological and bibliographic studies were carried out, including active interaction with local residents and users of objects located near the study area. Thus, A.O. Kuzmina, due to her own involvement in the contexts and processes of the designed territory, studying examples and samples of similar projects, constant support of managers and consultants, as well as active participation in scientific events on related topics during the work on the project, including testing in the expert community of the Council on Landscape architecture of the Union of Architects of St. Petersburg,

[143] Petrashen E.P., Speranskaya V.S., Kuzmina A.O. Destructive landscapes in the context of urban public space. Problems of rehabilitation, adaptation and integration // Bulletin of St. Petersburg State University. Art history. 2018. T. 8. No. 4. P. 693-714.

[144] There, p. 708.

[145] Perelet R.A., Umyvakin V.M., Shevchuk A.V. Qualimetric modeling of an integral assessment of the environmental hazard of territories of natural-economic geosystems // Proceedings of ISA RAS. 2014. T. 64, issue. 4. pp. 59-63. URL: http://www.isa.ru/proceedings/images/documents/2014-64-4/t-14-4_59-63.pdf. (date of access: 04/18/2018)

formed for her research and creative process the effect of a creative environment, which allowed her to work with the highest productivity in comparison with the experience of many other master's students, and to obtain excellent results that deserved not only the approval of the State Examination Committee, but also, later , recognition at the level of the leadership of her hometown of Saratov. This work became one of the examples that clearly confirmed the importance of immersion in the environment and the processes associated with it during the period of its creative rethinking, which had a significant impact on the further development of the concept of creating and using the effect of a creative environment.

A number of further examples of working with the creative environment are directly related to the spaces of St. Petersburg State University. The album “Alma Mater: architectural and spatial complex of St. Petersburg State University” is dedicated to the architectural and spatial complex of St. Petersburg State University, published in 2020 with the participation of the author of this study, which provides information about some projects in the chapter dedicated to the Peterhof campus of St. Petersburg State University[146]. In the context of the task of creating a creative learning environment, the objects of the Vasileostrovsky and Peterhof campuses of St. Petersburg State University are considered not so much through the prism of the history of their formation and the current architectural appearance, but from the point of view of the potential for transformation and influence on the training of environmental designers at St. Petersburg State University. It is assumed that their current state will certainly change for the better, as accurate and “evolutionary-based” concepts of use in the interests of the development of the entire university “organism” are formed, including with the help of non-standard and creative student design experiments. This idea and its confirmation by practice is a

[146] Alma mater : architectural appearance of St. Petersburg State University: [photo album / photographs: I.V. Charin; authors and compilers: A.E. Abramova and others. introductory remarks: T.A. Golikova, Corresponding Member of the Russian Academy of Sciences, Professor N.M. Kropachev]. - St. Petersburg: St. Petersburg State University, 2020. - 192 p. : ill., color. ill., portrait, fax. ; 29 cm.. - Bibliography. sublinearly note / Petrashen E.P. Chapter: Peterhof Campus, pp. 152-176.

prerequisite for the very possibility of interpreting the space of St. Petersburg State University as a creative environment in the process of training environmental designers.

The Vasileostrovsky campus of St. Petersburg State University consists of many buildings and a complex system of buildings, courtyards and gardens, some of which are combined into environmental complexes of different sizes, and some of which are separate objects. The experience of transforming objects within it, gained as part of the implementation of the "Environmental Design" program, is quite diverse in nature and scale, including the development of a new design for environmental complexes, individual rooms or landscape fragments. It was this experience that became key to the development of the methodology of "immersion in a creative environment" in order to develop the professional competence of environmental designers, since a number of projects were implemented in practice, which made the hypothesis proposed to students about the possibility of transforming university objects a reality, confirmed by the changes that actually occurred.

The purpose of using the "Press" element in the formation of a creative environment for training environmental designers is to transfer to students "tacit knowledge" associated with experiencing physical contact with the transformed environment and comparing the scale of real space with the virtual space of a drawing and 3D model. The presence of such an opportunity in the educational process greatly facilitates the formation of professional competence and the start in the profession after completion of training, as evidenced by the feedback from the participants in the experiments.

The most revealing experience in the development of the methodology was four Oriental classrooms: Thai, Japanese, Chinese and Korean, developed for the departments of the Oriental Faculty of St. Petersburg State University[147] and implemented using grants provided by partner organizations from the respective countries. The task of each of the

[147] Alferovsky K.A., Vitkovskaya S.V., Petrashen E.P. and others. Methodology of working with educational spaces of St. Petersburg State University using the example of eastern classrooms // Modern public spaces as a tool for the development of the urban environment: Materials of the II Interregional Scientific and Practical Conference (April 2–3, 2020) St. Petersburg: SPbGASU, 2020. P. 281 -285.

projects was to transform a standard classroom into a thematic one, reflecting the culture and spirit of the country being studied, using available design tools (Table 7).

Each of the projects included the following stages:

1. acquaintance with the existing situation at the design site and the formation of technical specifications for the user represented by the acting Dean of the Faculty of Oriental Studies and employees of the specialized department;

2. creating thematic collages based on images representing the life, traditions and culture, art, design and architecture of the country to which the cabinet being created is dedicated, as well as the search for ideas that reflect the cultural identity of the country that can form the basis for the design concept of the thematic cabinet;

3. development of design concept options, their discussion and selection of the optimal option with the Customer;

4. finalization of the selected option, creation of working documentation;

5. implementation of the project, with supervision.

"As a methodological approach to creating office concepts, we chose problematization based on two types of conflicts, the resolution of which becomes the basis of the design (scenario) and architectural (imaginative) ideas. Firstly, these are the operating features: the combination of educational and representative functions creates the basis for choosing in favor of mobile equipment and a variable scenario. Secondly, this is a special visual aesthetics, in which the combination of utilitarian (useful) and creative (creative) principles will create the basis for a modern interpretation of traditional techniques for creating an ethnic interior in the context of the development of the educational environment of St. Petersburg State University. Each time, the search for a solution to these basic conflicts was rethought by students and teachers, which made it possible to get closer to solving the actual "...task of a teacher: to develop in a student the ability of productive thinking, "love of wisdom," the natural need to comprehend the most complex range of issues and tasks."[148]. The main idea of each of the rooms was "the effect of moving the visitor to another cultural environment."

[148] There, p. 282-283.

The creation of the first of the objects, the Thai office, took place in a time frame that did not allow attracting students to work, due to the coincidence with the period of intermediate certification of students. In fact, this allowed the team of authors, which included two teachers and a graduate of the program, to create a sample to demonstrate an analogue of the creative "Product" when organizing similar projects in the future, with the participation of students.

Using the example of the Japanese office, the key, from the point of view of the influence of the "Press" element in the model of the functioning of the creative environment, was the experience of students' interaction with real space and thematic objects to form a creative plan for its transformation into a thematic office while creating new visual and conceptual images for it: "The creative search took place on several levels at once: image, idea, color associations and keywords. Three options were developed: "Minka - a traditional Japanese house", "Letterpress - a gallery of Japanese engravings", "Signs of the city - a modern metropolis". For further implementation, the second option was chosen, the idea of which was to create in the audience the atmosphere of a creative workshop of an artist or calligrapher."[149]. This idea was supported by the Department of Japanese Philology, as being consistent with the atmosphere that should arise in classes with Japanese studies students. "The subsequent (traditional for working with interior) stages were carried out mainly by teachers, but with the involvement of the most interested students as performers, not developers, within the framework of the second, variable, module of practice. At this stage, the following was carried out: adaptation of the project to applicable technologies and materials, search for a color solution, selection of equipment, production of drawings and visualizations, as well as designer's supervision during the implementation of the design project."[150]. On the day of the opening of the office, the student co-authors of the project who attended the ceremony were shocked by the experience of perceiving the new quality of the environment that arose with their direct participation, in exact accordance with the visualizations made by their hands. The display of pre-project analysis and project materials, as well as visits to

[149] There, p. 283.
[150] There, p. 284.

the office by other students, also cause a powerful motivational effect, due to contact with the real space created as a result of an experiment on using the effect of a creative environment in the educational process.

The Chinese office became a valuable experience in developing an imaginative interior concept for 4th year undergraduate students of environmental design as part of the “Industrial (pre-diploma) practice.” “A special feature of the project was the fact that, along with Russian students, students from China also worked on it. They acted both as designers and as experts in this process. Talking about China in the language of interior design, they simultaneously advised their colleagues on the accuracy of using figurative quotes in the interior of a Chinese office. The value of the experience of working on the Chinese Cabinet also lay in the fact that the students mastered all the necessary stages of interior design: they took measurements and photographed the room, interviewed the director of the Confucius Institute and the dean of the Faculty of Oriental Studies, prepared sketch proposals, presented their ideas at a presentation and received feedback. The variety of ideas proposed by the students in the group illustrated the range of solutions possible for this topic, revealed the degree of attention of different students to detail, their sensitivity or insensitivity to the stylistic integrity of the interior, the presence or lack of empathy for the needs of the future user of the space. The working stage of the project was carried out by the program teachers, who developed their own version of the solution, taking into account the technologies and materials available within the project budget, and presented it to students in the form of a master class. Summing up, we can safely say that the work on the offices of the Faculty of Oriental Studies at St. Petersburg State University has become a striking example of the combination of educational, methodological and creative project activities within the framework of the educational process."[151]. The Korean office, like the Thai one, was created by a team of teachers and a graduate of the program, in connection with the start of the development of the project during the holidays, when attracting students was impossible. Nevertheless, this project also contributed to the development of the methodology and the formation of a unique

[151] There, p. 284.

educational environment at St. Petersburg State University, expanding the range of techniques and materials used in practice that are now available for demonstration to students.

In 2022, an excursion to the Eastern Cabinets became part of the program of the Youth Festival “Cultural Code” at St. Petersburg State University, which confirms the significance and level of the resulting creative “Product” of application of the methodology[152]. Students studying in the program, getting acquainted with projects implemented for St. Petersburg State University, and receiving assignments on similar topics, understand that this is their chance to “go down in history” of the program and the entire university, as well as to receive a completed project in their portfolio while still studying.

Thus, as a result of the implementation of the “Eastern Cabinets” projects, the following aspects of the methodology for using the “Press” element in creating the effect of a creative environment to develop the professional competence of environmental designers were formed:

a) The effect of “moving” the visitor to another cultural environment through the contrast of thematic and ordinary spaces during the learning process. As part of the development of design design competencies, such movement-immersion becomes an important part of studying the project development process using the examples of the “Eastern Cabinets” projects as a creative “Product”, followed by a visit to the cabinets themselves to gain experience of their physical perception and assess one’s reaction to the space . The student gets the opportunity to understand the difference not only in quality and his emotional response to the resulting space, but also the experience of comparing the scale of drawings with nature, as well as assessing the compliance of the selected materials with the design of the project.

b) The effect of “taking the project into reality” is fully available only to participants in the process of creating objects, but, in an indirect form, through the study of photographic materials and design materials, as well as within the framework of an

[152] Culture of the East at St. Petersburg State University (November 11, 2022). URL:https://events.spbu.ru/events/ycf-2022/east (visit date 24.02.23)

interactive lecture-excursion to objects, it is also perceived by students studying these examples.

Another example of working with real space, as an element of “Press”, as the basis for a creative educational environment, is the “green heart” of the Vasileostrovsky campus of St. Petersburg State University - Botanical Garden. Interaction with it is available to students in four forms: a visit as part of an interactive lecture-excursion with the effect of moving into a contrasting natural environment in relation to the everyday one; practical in-depth acquaintance with plants in the process of participation in garden care work within the framework of practices; in-depth study of the garden space using the visual means of painting and drawing within the framework of plein air practice; the effect of the creative environment when designing its transformation and “bringing the project into reality” when participating in the competition of student gardens as part of the University Seasons festival (Fig. 35, 36, Table 8).

The effectiveness of the listed forms of using the effect of a creative environment for the formation of competencies, in comparison with the theoretical study of the fundamentals of landscape design, was tested in the following ways:

- the basics of landscape design and the principles of forming the composition of the garden were told to the experimental group of the 1st semester of study as part of an interactive lecture-excursion in the Botanical Garden during introductory practice, and to the control group in the classroom, using a presentation with photographs. When testing residual knowledge of landscape design before starting the first educational landscape project in the 3rd semester of study, the experimental group showed mastery of the studied material, while the control group needed to be re-explained;

- students who studied the main assortment of garden plants in the Botanical Garden were less likely to need reference literature when selecting an assortment for their project than students in the control group who did not go through this training format, but listened to the usual series of lectures;

- studying the garden space with the help of visual means of painting and drawing as part of the 1st year plein air practice allowed students to subsequently create landscape illustrations for their projects with fewer errors in scale, proportions and perspective

construction of images, the formation of color schemes and silhouettes of garden elements, as well as its composition overall, compared to the control group;

- the effect of the creative environment when designing its transformation and “bringing the project to life” when participating in the student garden competition as part of the “University Seasons” festival in 2022 and 2023, allowed the participants to synthesize previously acquired skills and fully integrate the design solution into the existing garden environment, in in accordance with the task set by the project curator, to gain unique experience in adjusting the project taking into account available materials during its implementation.

Thus, we can conclude that the use of the Botanical Garden environment as an element of the “Press” of a creative learning environment has confirmed its effectiveness for the formation of exhibition gardens as creative “Products”, as well as the professional competence and creativity of environmental designers, using the example of the experiment participants.

In 2014 – 2018 To train environmental designers in the basics of landscape design, the “Melnik's House” base, leased by St. Petersburg State University, in the Meadow Park of Peterhof was used. This object made it possible to adapt the teaching methodology using the effect of immersion in a creative environment already for the 2nd year, which significantly improved the quality of coursework on design in the 3rd semester. The task was based on the interpretation of the existing territory of the cultural heritage site of federal significance "Miller's House" and "Gatehouse" as part of the Tsarskaya Mill complex, which is part of the cultural heritage site of federal significance “Park Lugovoy (Ozerkovy)”, located at the address: St. St. Petersburg, Peterhof, st. Melnichnaya, 2., as a real design object.

“The base for learning practices of St. Petersburg State University “Miller’s House” is part of the ensemble of the unpreserved Tsar’s Mill, which was the heart of the Meadow Park, created around the hydraulic water supply system of the famous fountains of Peterhof. The history of the Tsar's Mill is amazing. Getting to know this place in itself is extremely important, as it helps to connect in the minds of students the history of the

Fatherland and the history of Russian architecture and art".[153] The task was carried out in two formats. In the first, the adaptation of the object to modern use as a base for the practices of St. Petersburg State University was considered. In the second, the site was considered outside the historical and cultural context, as part of a neighboring cottage community and a plot of individual housing construction "purchased as property" by fictitious families of students, but not during their student years, but after 15–20 years, at the peak of a successful creative career (Table. 9).

This version of the task included the development of a legend about the composition of the family, the selection of "business partners" from catalogs and the placement of a residential building and other buildings on the project site, and the development of a garden project. Conducting classes directly on site allows you to interact with it at all stages of work, starting with measurements and assessments "at the time of purchase" and ending with the "realization" of the planning solution for the site. In the control groups, completing a similar task without access to the transformation object occurred with noticeably greater difficulties. Students had difficulty understanding the scale and fullness of space, forming a composition as a whole, and most importantly, finding ideas for creating a unique image solution, while the participants in the experiment were able to generate and successfully implement creative ideas for developing a project.

Most of the graduation papers and coursework, the results of internships, workshops and master classes, including interuniversity, international and interdisciplinary, in the work of the OEP Environmental Design are dedicated to the former recreation center of St. Petersburg State University "Dacha Benois". Thanks to the principle of continuity in work, deepening approaches and their improvement at each stage, for the Benois Dacha, within the framework of M.V. Svetlova's master's thesis, defended in 2019 and summarizing the results of nine years of research, it was possible to formulate a holistic concept of restoration and development as an Art Residence of St. Petersburg State University (Fig. 37), which received the support of the Rectorate of St.

[153] Petrashen E.P. Methods of teaching landscape design to general environmental designers at St. Petersburg State University // Philosophy of Education. 2017. No. 1 (70). P. 100.

Petersburg State University and KGIOP, as well as the professional community in the field of cultural heritage conservation. The project is currently being finalized and prepared for its implementation.[154]. This example will be discussed in more detail in the next paragraph, devoted to the “Process” factor of element 2 of the model of the functioning of the creative environment.

An interesting experience in using the effect of a creative environment was the on-site internships that were conducted for students of the educational program “Environmental Design” in the Kaliningrad region and the Krasnodar region. This experience made it possible to establish that changes in region and climatic conditions, as well as the nature of the surrounding architecture, also contribute to increased creative activity and effectiveness in achieving creative results from practices[155]. Particularly valuable for the development of the concept of a creative environment based on cultural heritage objects was the experience of conducting practices at the request of the House-Castle Foundation in Chernyakhovsk with the subsequent development of a master’s project by Eremina A.S. based on the collected materials (Fig. 38, 39).

Thus, the proposed cases illustrate the use of the architectural and spatial environment as the “Press” factor of Element-1 of the Creative Environment functioning model. As part of the experiments, the formative effect of “immersing” students in special conditions was identified and confirmed in order to increase the creativity and involvement of students when interacting with a real environment, contrasting to the everyday one, in comparison with the use of photographic materials.

Novelty The result is to develop a number of practical examples that reveal methods for forming a creative environment, including using samples of the “Product” or analogue projects, in combination with the “Press” component of Element-1 of the theoretical model “The mechanism of functioning of the creative environment.”

[154] Petrashen E.P., Speranskaya V.S. Problems and methods of preserving architectural heritage. Complex "Benois Dacha" in Peterhof // Naukosfera. 2021. No. 2 (2). P. 6.

[155] Petrashen E.P. Formation of a model of a creative educational environment using the “Black Box” and “Compensatory Homeostat” methods // Proceedings of the Russian State Pedagogical University named after. A.I. Herzen. 2022. No. 203. pp. 228-240.

Empirical research allows us to conclude that the experience of immersing future environmental designers in a creative environment formed by the spatial situation "Press", which has transformational potential, within the framework of work on a project, can significantly increase the effectiveness of students' work and the quality of the projects they develop, with comparable input competencies at the beginning of work[156].

The contribution to the development of the theory lies in expanding the understanding of the essence of the "Press" element of the theory of creativity.

The contribution to the development of the methodology lies in identifying the algorithm for the formation of Element-1 of the model of the mechanism of functioning of the creative environment.

The contribution to the development of practice is to develop examples for organizing creative activities using the influence of the creative environment based on the potential of the spatial environment.

The next section of the dissertation will present the experience of forming a creative environment with an emphasis on the process aspect.

3.3. Design of creative and methodological work processes based on the model of the functioning of the creative environment

At the previous stage of the study, an analysis was carried out of the influence of Element-1 of the model of the functioning of the creative environment, which is based on the factor of the architectural and spatial environment, "Press". Placing previously described examples or analogues of the "Product" of planned creative activity in space, as well as, if possible, samples of materials, components and equipment to familiarize yourself with the technologies of their use and interaction with them, can enhance the described effect.

In the current section of the dissertation, examples of the organization of the "Process" will be considered as a key factor in Element-2 of the model of the functioning

[156] Petrashen E.P. The concept of a personality-oriented model for training environmental designers at St. Petersburg State University // Architecture and Construction of Russia. 2020. No. 2. P. 46-49.

of the creative environment. It should be noted that both the “Process” itself and the effect of the creative environment as a whole largely depend on the specific “Persons” involved in it. Based on the empirical experience obtained, it was concluded that the balance of more and less experienced and competent participants is important for its creation; this aspect deserves a separate study.

The relevance of this stage of the study is due to the importance of elaborating the scenario aspect of creating the effect of a creative environment, as a guiding, unifying and stimulating principle in achieving the planned results of using the creative environment.

The problem lies in insufficient knowledge of the influence of the creative environment on creative processes and the formation of competence of representatives of creative professions, in particular environmental designers.

Sources of information on these aspects, in the context of our research, are studies related to practical activities, management and training in the field of art, environmental design and architecture, as well as modern information technologies and individual management techniques and approaches described in business literature. A number of studies have also been identified that are directly devoted to learning using elements of a creative environment.

The research hypothesis assumes that “Process”, as a factor of Element-2 of the creative environment functioning model, includes scenario modeling that determines the balance of spontaneity and organization of the process, alternation of a comfortable and creative environment, timing and stages of achieving the goal, types and methods of activity taking into account their provision with various resources, the number and level of development of the competencies of the participants, taking into account their roles in the project and design goals.

The purpose of this section is to consider examples of the organization of the “Process” in a creative environment, from the point of view of the influence of this factor on the formation of “Products” of the creative environment.

The positive effect lies in the possibility of moving forward to considering the effectiveness of the process from the point of view of increasing the competence,

creativity and creative productivity of “Persons” - future environmental designers - in a creative environment.

The results of the theoretical part of this study are used as the main theoretical principles on which the current stage of the research is based.

The empirical study is organized as a series of experiments to solve various methodological and creative problems through the organization of “Processes” aimed at creating the effect of a creative environment to solve specific problems, taking into account the competencies of the participants. In the next section of the study, the experience of assessing the effectiveness of such a process will be shown using examples of changes in the individual competence profiles of some participants in the experiments.

An illustrative example of the positive influence of the creative environment effect was the experience of solving the problem of organizing educational and methodological work on modernizing the work programs of academic disciplines (WPD) and practices (WPP) using the creative environment effect in virtual space based on a system of models for developing the competence of an environment designer. This problem can be presented as follows:

Given: requirements for changing curricula, WPD and WPP in accordance with Federal State Educational Standard 3++; the number of WPD and WPP subject to modernization is 125 pieces, the composition of teaching stuff is 40 people, the work time frame is 1 month.

Required: develop competency indicators and make changes to curricula and work programs of disciplines and practices.

Let: low involvement of teachers in methodological work, avoiding additional workload (annually, on average, 5 teachers participate in the modernization of programs, which corresponds to 6% of faculty members). The volume and timing of the work make it impossible to complete it without participation of the entire team.

Hypothesis: it might be possible to increase the involvement of teaching staff in the modernization of the WPD and WPP, and achieve results within the established time frame, by creating a creative “Process” within the framework of a virtual creative environment aimed at increasing work productivity.

Solution:

1. Using padlet.com technology, an interactive information table was created, including a section with reference materials, guidelines and samples of modernized WPDs and WPPs; bookmarks indicating the names of responsible teachers and links to online documents of work programs of disciplines and practices to correct, grouped into eight blocks; color indication to indicate the dynamics and stages of work on files: red – work has not started, yellow – in progress, white – the program is ready for verification, green – checked by the program manager (Fig. 35).

2. A chat and a group at social net have been organized for prompt communication on emerging issues and to enhance the effect of joint presence in a common virtual workspace.

3. The comprehensive competencies of the curricula are formatted in interactive online documents for joint editing, pinned on the information board, samples of their division into indicators – active qualities – have been developed, which made it possible to jointly develop the remaining indicators and identify matching indicators in various competencies.

4. The disciplines of the curriculum are distributed into eight groups of dominant active qualities of competencies formed in the discipline, in accordance with the LSM of professional competence of an environment designer, which made it possible to clarify the distribution of competencies and their indicators across disciplines.

5. If necessary, the “Process” was supplemented with online conferences and individual consultations based on mutual assistance from teachers, which improved horizontal communications in the team and reduced the load on the manager.

6. The most effective participants in the “Process” received additional results in the form of thanks and bonuses.

Conclusion: Thus, a virtual creative environment was obtained, used as a “Press” (Fig. 40), access to samples of the “Product” was provided to facilitate work, an interactive “Process” of work was modeled, the personal characteristics of the “Persons” were taken into account in terms of preferred methods communications, which, in total, made it possible to increase the involvement of teachers by 70%, and overall work

efficiency by 200%, compared to previous experience of similar work, in which similar instructions and information were delivered by e-mail.

In the process of modernizing programs, an understanding arose of the possibility of forming a fund of assessment tools and control and measurement materials also for the obtained groups of disciplines and competency indicators, which created the prerequisites for further improvement of the system for testing the level of competencies of students. Repetitions and gaps in the formation of the content of work programs of related academic disciplines and practices were also identified; the balance of the content of teaching environmental design has been increased from the point of view of achieving interdisciplinarity, relevant for the development of environmental design in the context of the tasks of convergence of science and art, and education for sustainable development.

The process of developing and implementing the project to revive the Benoit Dacha allowed us to develop and apply a number of different scenarios for creative interaction. A whole series of graduation papers and coursework, the results of internships, workshops and master classes, including interuniversity, international and interdisciplinary, are dedicated to the former recreation center of St. Petersburg State University “Dacha Benois”. The work was based on the principle of continuity, deepening approaches and improving them at each stage, as a result of which it was possible to formulate a holistic concept for the Benois Dacha for restoration and development as an Art Residence of St. Petersburg State University, which continues to develop[157].

The first experiments in analysis and development were not based on a systemic-categorical methodology and the targeted use of the creative environment, which made it difficult to identify a set of problems of an object and develop a feasible and viable concept for its new use. The method of successive approximations was used with the help of design experiments and the “technique”, which consisted of transferring the developments of each project to the next developer for further search for solutions. Three WRCs on the topic and a number of course projects were completed (Fig. 41-45). On the fourth approach to the topic, at the initiative of the author of this study, the methodology

[157] Petrashen E.P., Speranskaya V.S. Problems and methods of preserving architectural heritage. Complex "Benois Dacha" in Peterhof // Naukosfera. 2021. No. 2 (2). pp. 6-11.

of the master's work was based on the goals of sustainable development and the triad of sustainable development. The five most relevant SDGs for the project were selected, which were then transformed into a sustainable model for the revitalization of the Benoit Dacha. This approach made it possible to formulate the principles of revitalization based on the SDGs, to find and justify key solutions to the concept of restoration and development of dachas and the park of the former village of Bobylskaya as the Art Residence of St. Petersburg State University.

The resulting project received an “excellent” rating during its defense and was recommended for implementation in 2019, and then was presented to the Rector of St. Petersburg State University and the Committee of State Inspection and Protection of Monuments (KGIOP), earning approval for further development (Fig. 46).

The approach developed within the project to modeling the key provisions of a design study and project based on sustainable development goals formed the basis for the formation of a model of the content of environmental design using the “Hexagram” method, presented in the first chapter of this dissertation.

The development of the project continued in the form of workshops, interuniversity practices and master classes, organized using the effect of a creative environment (Fig. 47), the experience of which formed the basis for the creation of a methodology for conducting clinical practices at the “Museum and Architectural Clinic of St. Petersburg State University” (see Appendix 2).

Based on a generalization of experience in organizing this process, a flow diagram of a comprehensive project for the restoration of M.N. Benois, A.A. Grube and L.I. Kron dachas (Fig. 48) and a model of the project management process in the structure of St. Petersburg State University were developed, that united the components of this self-developing system, taking into account the interaction and mutual activation of its elements[158] (Fig. 49).

[158] Petrashen E., Rich J.D., Alferovskii et al. Art residence “Dacha Benois” in Peterhof as an innovative educational and cultural project of Saint-Petersburg university // EDULEARN21 Proceedings. 13th International Conference on Education and New Learning Technologies (Online Conference. 5–6 July, 2021). Valencia: IATED Publ., 2021. P. 8206-8214.

Further work on organizing events for the revitalization project was carried out on its basis, including the organization of volunteer events and cultural events, and the preparation of applications for grants.

Since 2021, open plein airs and exhibitions of the Art Residence began (Fig. 50). To date, 2 exhibitions have been held with the participation of more than 20 artists with more than 75 paintings. In 2021-22, a number of cleanup days were held aimed at restoring the heritage objects, including jointly with the St. Petersburg city branch of the All-Russian public organization “All-Russian Society for the Protection of Historical and Cultural Monuments” (VOOPIIK) (Fig. 51). As part of a cooperation agreement with VOOPIIK, a “Volunteer Campus for the preservation and study of wooden architectural monuments of St. Petersburg (Season 3)” was held using grant funds provided by the Russian Cultural Foundation, within the framework of the “Culture Volunteers” program of the national project “Culture”[159] (Fig. 52). As a result of field surveys, digital copies of cultural heritage objects were obtained, photographic recording was carried out, and manual measurements of monuments were carried out.

Based on the received materials from measurement practice and developed conceptual models, work on the project continued in the format of a temporary creative team of the 1-st year students of the master's program “Environmental Design” and teachers of St. Petersburg State University, with the support of external experts, in particular, the licensed design and restoration organization ASM GROUP.

Before starting work, students had to study all the work done previously, the history of the object, conduct a field survey and immerse themselves in the cultural context, which made it possible to organize an intensive educational and creative process using the effect of a creative environment, by conducting part of the classes in unusual conditions: directly on design site, in the Sergievka estate, as well as in the Conference Center of St. Petersburg State University “Mendeleev”.

As a result of the work, the following results were obtained, clarifying the previously developed concept:

[159] URL: https://grants.culture.ru/news/spasti-dachu-benua-peterburgskie-volontery-provedut-3-sezon-kampusa-volonterov-po-sokhraneniyu-i-izu/ (date of access: 08/08/2023)

- measurement drawings of the monuments;
- “time line” of the history of the object and project;
- the goals of the project were clarified;
- project mind map;
- target groups and directions of project development were clarified;
- scenario models for different target groups;
- event calendar of the Art Residence;
- pre-design concept of a local history information center or educational museum as part of the Art Residence;
- the concepts of use and interior design of the main premises were clarified;
- scheme of thematic zoning and equipment of the park landscape.

As a result of the work, a joint exhibition of the project and the participants of the Grand Plein Air 2022 “The Legacy of the Benois Dacha” was held at the Lomonosov Museum of Local Lore, as part of the opening of which a conference was also held with a presentation of the project by students and reports on its topics from museum staff and teachers of St. Petersburg State University (Fig. 53, 54).

Using the example of this project, we can talk about both increasing the effectiveness of developing a project as a “Product” when organizing a targeted “Process” of work using samples and immersion in a creative environment, and about increasing the competence of “Persons” – participants in the “Process”, on example of an experimental group, thanks to the use of a system of models of a synthetic concept of environmental design in the process of generating and developing ideas.

The positive effect of the results of this stage of the study lies in the possibility of moving on to considering the role of the “Person” in the Model of the Functioning of the Creative Environment, as a factor of Element-2, as well as changes occurring in the level of creativity and competence of the “Persons”, as “Product-2” of the creative environment.

The contribution to the development of the theory lies in the development of ideas about approaches to organizing a creative educational environment in the interests of

individualizing the educational process and involving teachers in methodological and creative work.

The contribution to the development of the methodology lies in expanding the tools for organizing educational activities.

The contribution to the development of practice consists in the development of recommendations and cases for practical work with conceptual models for developing the competence of an environmental designer.

In the next section of the dissertation, an empirical study will be carried out to evaluate the effectiveness of the use of systems of conceptual models of the theoretical foundations of environmental design and the formation of professional competence of an environmental designer, as well as the effect of a creative environment, from the point of view of increasing the satisfaction, competence and creativity of “Persons” involved in educational and creative "Process" in a creative environment.

3.4. Assessing the effectiveness of using a system of models of a synthetic concept of environmental design in creative, design and educational activities

At the previous stage of the study, testing of the use of a system of models for developing the competence of an environmental designer was carried out and described, taking into account the use of a system of models of a synthetic concept of environmental design and the functioning mechanism of a creative environment. A model for managing the creative environment is proposed, visualizing the principle of integrating the creative environment into the organizational structure of the university using the example of the concept of the St. Petersburg State University Art Residence. In the current section of the dissertation, testing of the methodology for testing the learning outcomes of environmental designers will be carried out and described, taking into account the practical use of the results of theoretical research through the creation of individual competency profiles of students, as well as the experience of group work using the competency wheel of a creative team.

The relevance of the study lies in improving the methodology for training and assessing the qualifications of environmental designers, as part of the tasks of improving the quality of personnel training for the implementation of the national project “Formation of a comfortable environment for living in Russia.”

The problem lies in the insufficient development of methods for testing the professional competence of environmental designers, which leads to a decrease in the complexity of project development and difficulties in forming creative teams for design.

The study is based on the results obtained at the previous stage in the fourth paragraph of the second chapter of this dissertation.

The hypothesis lies in the assumption of the feasibility of using the proposed test system to assess the effectiveness of using a system of models of a synthetic concept of environmental design and the effect of a creative environment in the creative process to improve the professional competence and creativity of environmental designers.

The objective of the experiment is to test the proposed system for testing the formation of professional competence of environmental designers, taking into account expert assessment and self-assessment, identifying various aspects of interdisciplinary professional competence, which will allow us to draw a conclusion not only about the creative and technical preparedness of the designer, but also about his personal characteristics, interdisciplinary and over professional skills, as well as the adequacy of his self-esteem and communication skills.

As part of the study, more than 40 students of the “Environment Design” degree programs of St. Petersburg State University and participants in interuniversities workshops and master classes who were at different stages of developing competence and undergoing various forms of training, including using conceptual models of environmental design and the effect of a creative environment, were tested.

Based on testing, including self-assessment and expert assessment, options for individual competency profiles of the experiment participants were obtained, and temporary creative teams were formed to complete project tasks.

A comparative analysis of competency profiles obtained as a result of self-assessment and expert assessment was carried out, including at different stages of training

for a number of students. An analysis of the success of the work of creative teams was carried out, depending on the characteristics of the collective competence profile. A conclusion was made about the effectiveness of the methodology for assessing changes in competence at different stages of training, including after completing internships using the effect of a creative environment (Table 10).

When testing and summarizing the results, it was revealed that students at the beginning of their studies, as well as those lagging behind in their studies, tend to overestimate the level of development of their competencies, which is a sign of unconscious incompetence. Taking the test helps increase their awareness and motivation for further learning. In older courses, the most successful students tend to underestimate their level and underestimate their results in self-assessment. In such cases, comparison with an expert assessment helps to realize your successes and increase confidence in your readiness for a successful career start (Table 11).

The identified trends reveal a useful effect of the proposed assessment system, which consists in increasing the adequacy of self-esteem as a personality quality that affects the success of one's professional activities. All participants in the experiment noted the value of taking the test and visualizing the strengths and weaknesses of competence on the diagram, as a tool for reflection and forming a strategy for further development with a focus on increasing expertise in their unique, "strong" field, combined with the development of communication skills for successful work in team, or improving one's "versatility", which will allow, in the future, to become a successful leader of an interdisciplinary creative team.

Using the example of a temporary creative team of first-year undergraduates who worked on the development of the St. Petersburg State University Art Residence project "Dacha Benois" in 2023 with the support of teachers and external experts, the change in the collective "Wheel of Competence" as a result of joint creative activity in a creative environment is shown (Table 12).

Analysis of the test results allows us to talk about the effectiveness of the proposed system of models for planning and assessing learning outcomes. The accuracy of testing results can be increased by developing more detailed tests for each of the groups of

competencies, selecting examples for comparative assessment of the test taker's capabilities with samples when answering questions related to image assessment, as well as creating a system of tests of varying complexity for use at different stages of training, as part of a separate study.

The presented examples of individual profiles of professional competence of an environmental designer, as a synthesis of competencies in the field of art, science and technology, are consistent with the previously identified need to combine competency-based and student-oriented approaches when training creative individuals to ensure high-quality training in the field of environmental design and the subsequent formation of a professional standard environmental designer, as well as the concept of forming creative teams through the creation of a "collective wheel of competencies."

The results obtained are fully consistent with the research hypothesis, namely, they confirm the assumptions that:

1. The professional competence of an environmental designer is interdisciplinary in nature, based on the synthesis of competencies in the field of art, science and technology, however, the individual competence profile formed during the learning process depends on the personal orientation and creativity of the particular student.

2. Finding a balance between uniqueness and universality of competencies is an important element of goal setting in the personal development strategy of an environmental designer.

The "wheel of competencies" model in various forms is actively used in business training, but we have not identified any examples developed for training environmental designers, or, more broadly, developed on the basis of logical-semantic modeling. Also, no tests were identified that were formed on the basis of a universal scale of levels of competencies that allow combining self-assessment and expert assessment of the competence profile.

The significance of the results obtained is determined by the confirmed potential for improving the quality of training in environmental design and the intended prospect of forming a qualification framework for environmental designers. The scientific novelty of the research results is determined by the lack of analogues of the system for assessing

the qualifications of environmental designers, including those based on a combination of self-assessment and expert assessment with the ability to visualize the results for comparison, which have a pronounced coaching effect.

Thus, based on testing the testing methodology and the formation of individual competency profiles of environmental designers, a comparative table was obtained demonstrating the gradual change in the nature of competency profiles during training, namely, approaching the “Wheel” shape and identifying characteristic individual active qualities, as well as discrepancies in self-assessment and expert assessment of learning results, which determines the novelty of the methodology. The positive effect is determined by the identified and described “coaching” effect of the proposed methodology, which helps to increase the motivation and awareness of the choice of an individual self-development strategy by the environmental designer. In addition, the effectiveness of using the “collective wheel of competencies” to form a creative team has been confirmed.

The contribution to the development of theory lies in the development of ideas about the professional competence of an environmental designer and the individualization of personnel training in environmental design.

The contribution to the development of the methodology lies in the development of the concept of a methodology for testing the professional competence of an environment designer, including both the possibility of self-testing and the possibility of expert assessment, which has the potential for further clarification and development.

Contribution to the development of practice consists of creating recommendations and cases for practical application and assessing the professional competence of an environmental designer when hiring and forming creative teams.

Prospects for the development of this research are seen in clarifying and detailing the methodology for testing the professional competence of an environmental designer and conducting further empirical research on its basis.

Conclusions on the third chapter

Thus, empirical research and experimental testing of the results obtained in the theoretical sections of the dissertation, using the example of the implementation of the OOP “Environmental Design” of St. Petersburg State University using the mechanism of functioning of the creative environment, showed the importance of each of the elements of the resulting system and the mutual influence between them. The experiments conducted confirm the feasibility of integrating the proposed model systems into practical design activities and the structure of educational programs in the field of environmental design. The developed recommendations and cases of practical application of the proposed conceptual models and theoretical foundations of environmental design demonstrate the opportunity to increase the efficiency and complexity of pre-design research and search for proposals. The proposed system of models for forming the competence profile of an environmental designer and a creative team, as well as examples of tests conducted, have shown their effectiveness in developing the professional competence of environmental designers, including increasing motivation, awareness and satisfaction, both among students and among teachers of the program; In addition, the model of the functioning of the creative environment is supplemented by a model of its integration into the university management system, which, together with examples of the use of the developed models, makes it possible to transfer the experience of using the effect of the creative environment to similar educational programs in other universities.

CONCLUSION

In the dissertation, based on a categorical-system approach to the analysis and synthesis of bibliographic and empirical research data, using circuit design methods, a synthetic concept of environmental design is developed and presented in the form of a system of models reflecting key aspects of the theoretical foundations of environmental design as an interdisciplinary art form, such as as its content, the conceptual apparatus of the subject area, goals and boundaries, principles of functioning of the creative environment, as well as the professional competence of the environment designer in the context of the paradigm of convergence of science and art. The experience of introducing the concept into the practice of design and training in environmental design is presented using the example of the implementation of the educational program “Environmental Design” at St. Petersburg State University.

The main findings of the study are as follows:

- a categorical model of the content of environmental design as an interdisciplinary art form has been developed, including the basic categories of its subject area and visualizing the main semantic directions of searching for solutions (algorithms) in environmental design, in the context of sustainable development goals, thereby clarifying the synthesizing role of environmental design in the paradigm of convergence of science and art, which made it possible to propose a synthetic concept of environmental design.

- a model of the conceptual apparatus has been proposed to describe the subject area of environmental design, reflecting its interdisciplinary connections in the context of sustainable development goals, revealing the essence of the categories “strength”, “benefit”, “beauty” with the help of clarifying triads of concepts such as “volume-spatial”, “ engineering and technological" and "operational" "solutions", "ecosystem", "functional" and "consumer" "value", "embodiment", "impression" and "ideal", which can also be clarified using the next level of decoding of concepts , which allows you to describe the subject area with the required degree of completeness and taking into account the hierarchy of semantic levels of concepts;

- a system of models of design goals and boundaries in environmental design has been developed, reflecting the factors of the uniqueness and universality of the environment, namely, ranges of qualities have been identified, the choice of balance between which determines the design goals, such as the opposite states of a unique - personal and universal - social, comfortable and developmental environment. In addition, contradictions that arise in understanding the key factors of comfort and creativity of the environment have been identified, conceptual models have been developed that allow us to visualize these contradictions in order to clarify design goals by planning the expression of key factors in the designed environment;

- a “design code matrix” has been developed to program the degree of expression of factors of comfort and creativity of the environment when designing and/or analyzing the existing parameters of the design object;

- a theoretical model of the functioning of a creative development environment is proposed as a unique resource that allows stimulating creative productivity and effectiveness, in particular, within the framework of educational activities;

- a logical-semantic model (LSM) of the professional competence of an environmental designer has been developed. And a system of models representing the formation of the competence of an environmental designer as a non-linear evolutionary process, which allows planning and assessing the development of competence by constructing an individual competence profile;

- testing was carried out and examples and methods of using a system of models of a synthetic concept of environmental design and the effect of a creative environment were described to increase the effectiveness of educational, methodological, research and design and creative work;

- a model for integrating the creative environment into the management system and educational environment of St. Petersburg State University has been developed, using the example of the St. Petersburg State University Art Residence project “Dacha Benois”, which can be recommended for use in other educational institutions that have similar management objects, as well as a tool for advanced training and motivation of specialists.

The scientific novelty of the research lies in the fact that a synthetic concept of environmental design has been developed for the first time, and a scientifically based and interconnected system of models has also been developed for the first time, representing the key elements of the concept of environmental design as a type of interdisciplinary art.

The practical and scientific benefits of the research are due to the successful application of the resulting models in practice, confirmed experimentally, taking into account the comparison of the productivity and effectiveness of various types of professional activities of environmental designers, using a system of models of the concept and effect of a creative environment, and without their use.

Thus, the research hypothesis is fully confirmed, since it has been established that the tools proposed in the research results allow solving the scientific problem posed.

Prospects for further development of the topic include:

- further development of the conceptual apparatus of the subject area of environmental design through the consistent application of other categorical-symbolic methods;
- further development of ideas about environmental design through the development and refinement of models of the functioning of a comfortable, creative and therapeutic environment;
- detailing and clarifying the system of tests and tasks for the formation and assessment of the levels of formation of the active qualities of professional competencies and qualifications of an environment designer, organizing training using the effect of a creative environment;
- clarification of educational and professional standards, work programs of academic disciplines and practices in the field of environmental design.

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APPENDIX 1

Chapter 1. FORMATION OF THE THEORETICAL BASIS OF THE SYNTHETIC CONCEPT OF ENVIRONMENT DESIGN.

Fig. 1. Categorical-symbolic method “Hexagram”.

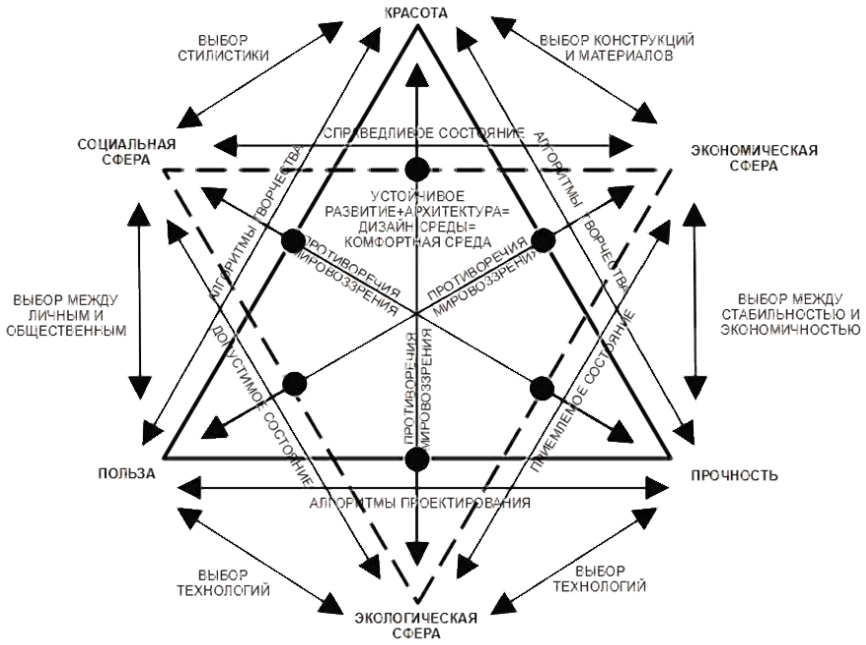


Fig. 2. Formation of a conceptual model of the content of environmental design using the categorical-symbolic method “Hexagram”.

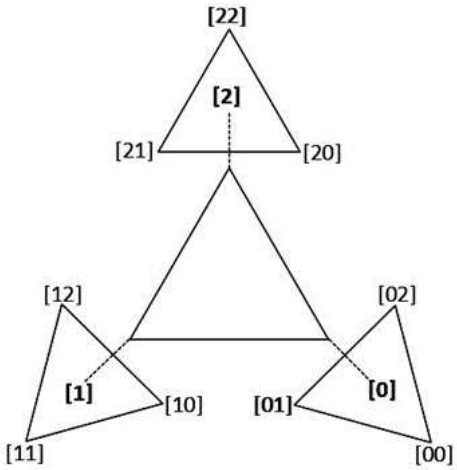


Fig. 3. Scheme of Two-level triadic decryption.

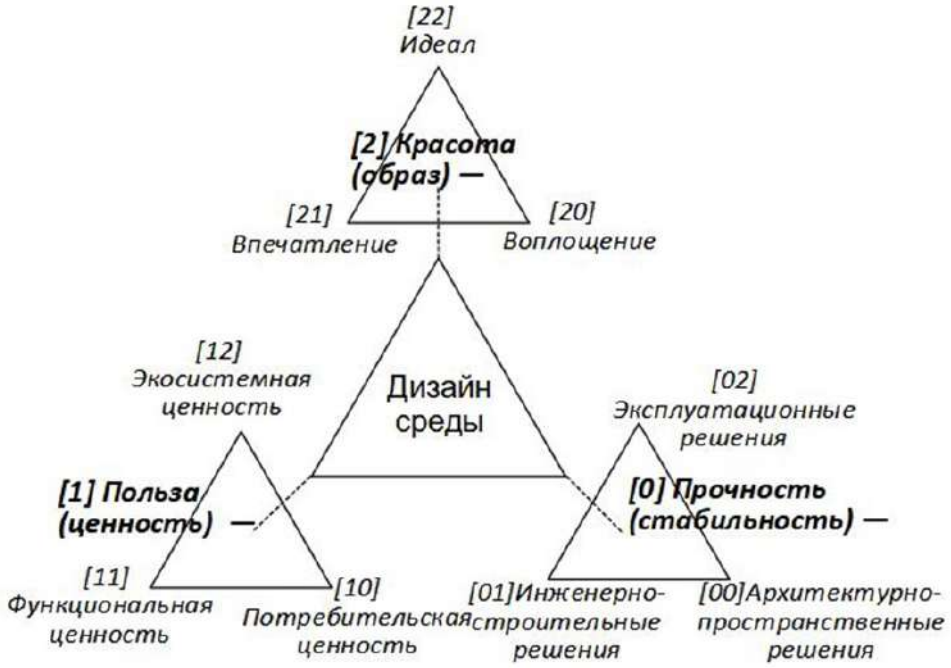


Fig. 4. Conceptual model of the conceptual apparatus of the subject area of environmental design, using the method of Two-level triadic decoding.

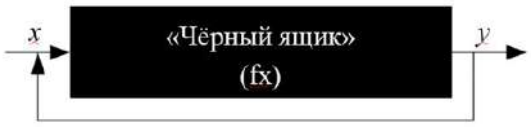


Fig. 5. Categorical-symbolic method “Black box”

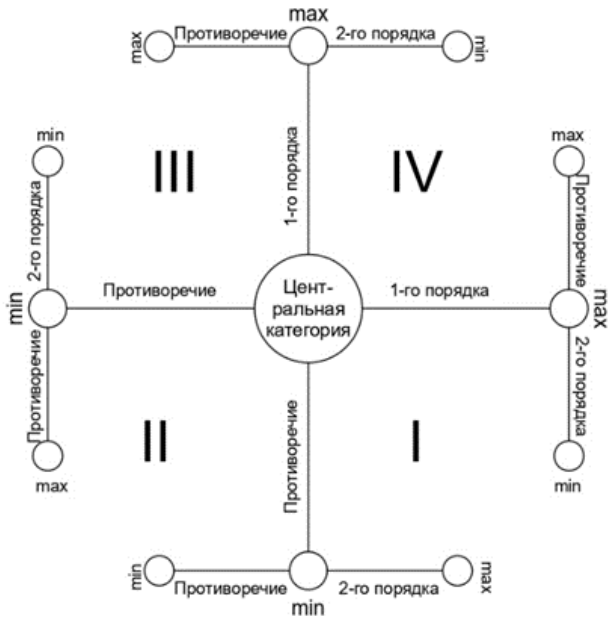


Fig. 6. Categorical-symbolic method “Celtic cross”.

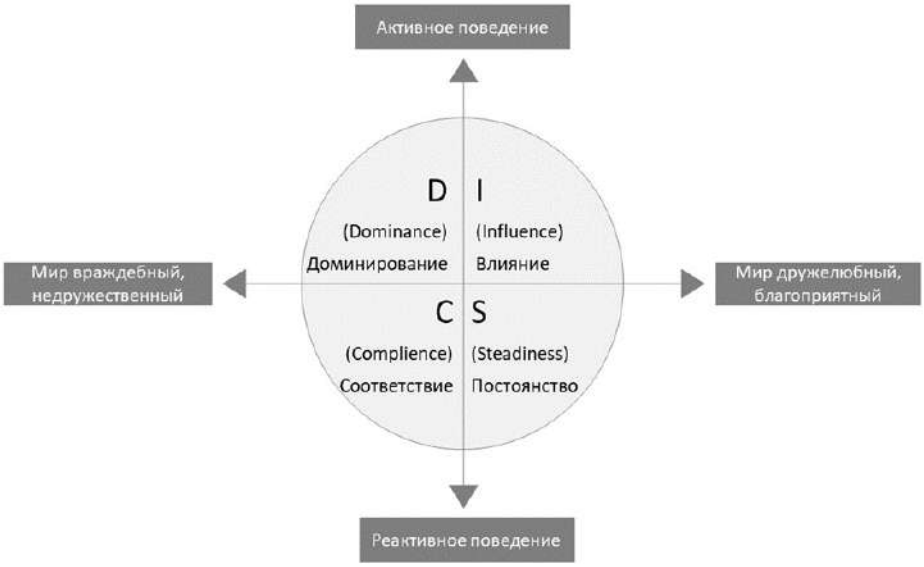


Fig. 7. Behavioral types of the DISC technique

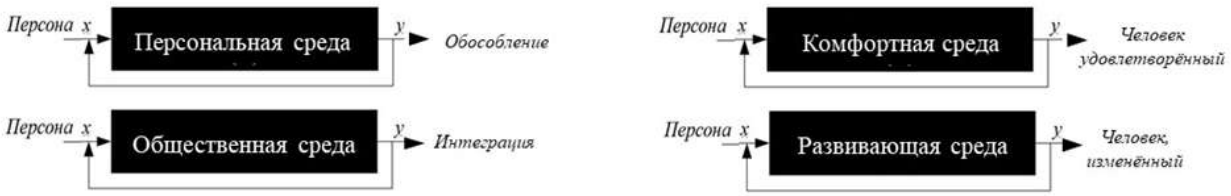


Fig. 8. “Black box” model for four main types of environment: Personal (unique), General (universal), Comfortable and Developmental (interactive and creative).

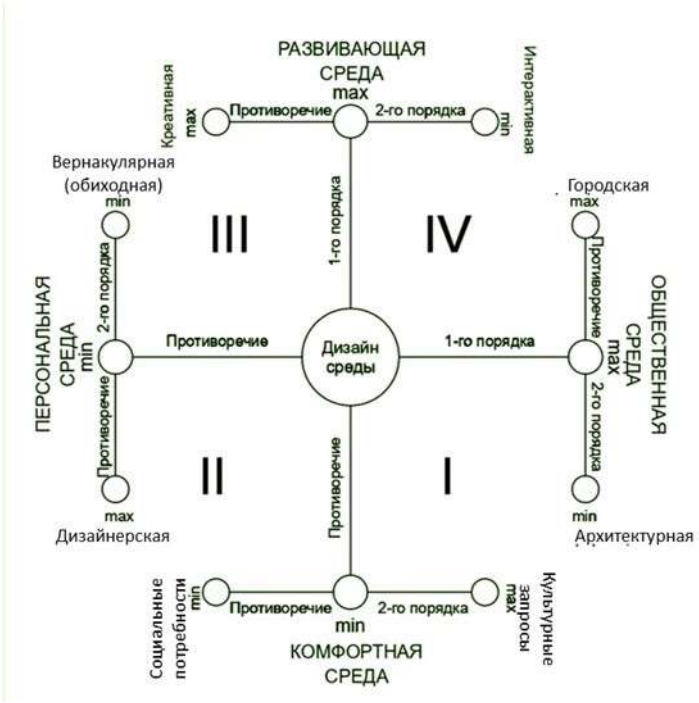


Fig. 9. Conceptual model of contradictions in environmental design using the “Celtic Cross” method.

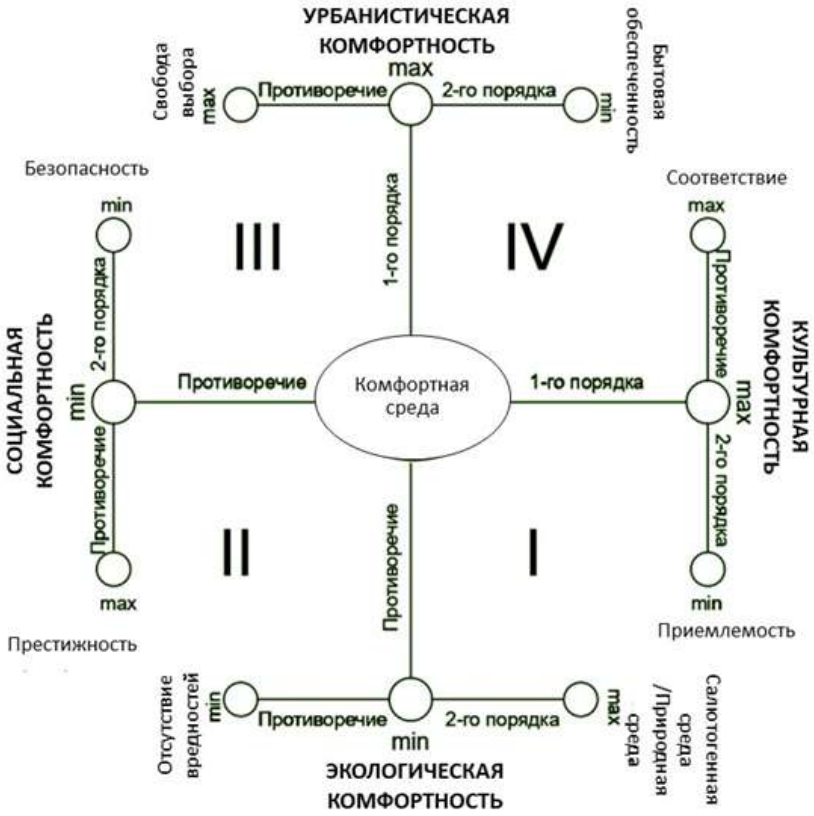


Fig. 10. Conceptual model of contradictions between environmental comfort factors using the “Celtic Cross” method.

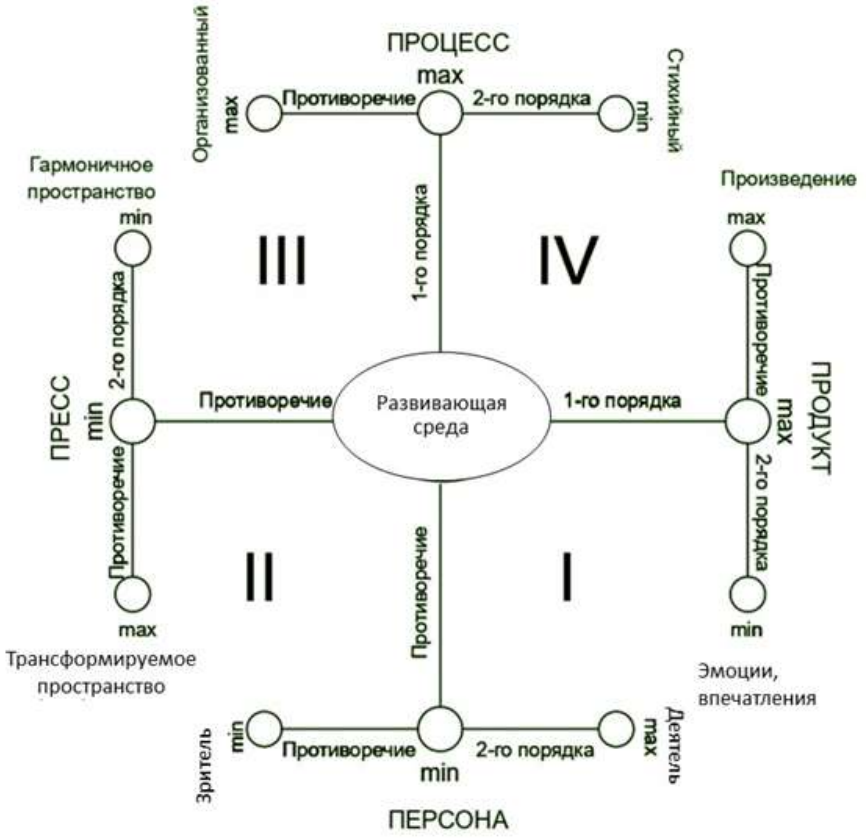


Fig. 11. Conceptual model of contradictions between environmental creativity factors using the “Celtic Cross” method.

Table 1. “Design code matrix” for the comfort and creativity of the environment.

1st order contradictions (Min-Max)	*Personal (unique) environment - universal*		*Social Comfort-Cultural Comfort*		*Ecological comfort-Urban comfort*		*Person (subject of influence) - Process (interaction*		*Press (spatial environment) - Product (idea embodiment)*	
Contradictions of comfort 2nd order (Min-Max) %	*Designer*	*Shelter*	*Prestigious*	*Corresponding*	*Salutogenic/ Natural*	*Giving freedom of choice*	*Actor*	*Organized/Focused*	*Harmonious*	*Work, Product*
20/80	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*	*20/80*

	35/75	*35/75*	*35/75*	*35/75*	*35/75*	*35/75*	*35/75*	*35/75*	*35/75*	*35/75*
	50/50	*50/50*	*50/50*	*50/50*	*50/50*	*50/50*	*50/50*	*50/50*	*50/50*	*50/50*
	75/35	*75/35*	*75/35*	*75/35*	*75/35*	*75/35*	*75/35*	*75/35*	*75/35*	*75/35*
	80/20	*80/20*	*80/20*	*80/20*	*80/20*	*80/20*	*80/20*	*80/20*	*80/20*	*80/20*
	Everyday, vernacular	*Perspective*	*Safe*	*Acceptable*	*Free from hazards*	*Providing for needs*	*Viewer*	*Spontaneous*	*Transformable*	*Positive emotions, experience*
Uncomfortable environment (Max)	*Marginal*	*Destructive*	*Dangerous*	*Inappropriate, unavailable*	*Environmentally unfavorable*	*Scarce*	*Victim*	*Compelled*	*Depressed*	*Rejection*

Chapter 2. COMMUNICATIONAL ASPECT OF CREATIVE ENVIRONMENT DESIGN AND FORMATION OF DESIGNER COMPETENCE

Table 2. Examples of artist colonies, estates of artists, creative houses and art residences.

1	"The Red House" by W. Morris, created as part of the Arts and Crafts and Century Guild movements in 1859-60. architect Philip Webb and artist William Morris, interiors by Pre-Raphaelite artists: Edward Burne-Jones and Dante Gabriel Rossetti	Makarov K. A. Aesthetics of Morris and the fate of decorative art in Russia // Aesthetics of Morris and modernity. M., 1987. P. 256. URL:https://books.totalarch.com/aesthetics_morris_and_modernity (access date: 08/23/2021).

2	Barbizon School.Founder and inspirer - Pierre-Etienne-Theodore Rousseau, artists J. Duprier, N. Diaz, C. F. Daubigny, C. Troyon and others.	Kabalyuk E. O. Development of new art. Political unrest in France as a catalyst for the emergence of impressionism // Innovative solutions to social, economic and technological problems of modern society. – 2021. – P. 96. URL: https://pure.spbu.ru/ws/files/85110335/_.pdf#page=96 (date of access: 07/16/23)
3	Abramtsevo. Owners: writer S. T. Aksakov (since 1843), industrialist S. I. Mamontov (since 1870). Visited: writers I. S. Turgenev, M. N. Zagoskin, N. V. Gogol, S. P. Shvyrev, poet F. I. Tyutchev, actor M. S. Shchepkin, historians T. N. Granovsky and M. P. Pogodin, folklorist A. Hilferding, Slavophiles A. S. Khomyakov, I. V. Kireevsky, P. V. Kireevsky and others; artists I. E. Repin, V. M. Vasnetsov, A. M. Vasnetsov, V. D. Polenov, V. A. Serov, P. P. Trubetskoy, I. S. Ostroukhov, M. A. Vrubel, M V. Nesterov, K. A. Korovin, I. I. Levitan, A. T. Matveev (Mamontov art circle), I. S. Efimov, musicians, actors, singer F. I. Chaliapin	Borisova E. A. Architecture in the works of artists of the Abramtsevo circle: (At the origins of the “neo-Russian style”) // Artistic processes in Russian culture of the second half of the 19th century / Academy of Sciences of the USSR, All-Russian Research Institute of Art History of the USSR Ministry of Culture; resp. ed. G. Yu. Sternin. - M.: Nauka, 1984. - P. 137-182. Under the canopy of the muses. Abramtsevo // Knowledge is power. - 2020. - No. 8. - P. 4-35. [Editor's note]. — P. 4. Gruzdeva-Tramich K., Harutyunyan S. “The beauty of utility and the utility of beauty” of the Abramtsevo estate. - P. 5-13. Krechetova A. The path of the cultural artist. - P. 14-19. Gruzdeva-Tramić K. Terem, built by the artist. — P. 20-25. Nashchokina M. V. “Focus on creation is one of Abramtsevo’s lessons.” — P. 26-35.
4	Talashkino, Flenovo. C. 1893 in the possession of the princess M. Tenishevoi, painter: S. V. Malyutin, Mikhail Vrubel, Nikolai Roerich, Alexander and Albert Benoit, Mikhail Nesterov, Konstantin Korovin, Ilya Repin, sculptor Pavel Trubetskoy, composer V. V. Andreev and Igor Stravinsky and others.	Rybchenkov B. F., Chaplin A. P. Talashkino: Album / Author: B. F. Rybchenkov, A. P. Chaplin; Comment. B. Rybchenkova and others - M.: Fine Arts, 1973. - 48, [118] p. Nazarova T. Talashkino - “Athens of Russian peasants” // Beloved Russia. 2006. No. 2 (3). P. 112-121. Pozdnyakova K. G. The art of ceramics in the creative practice of Russian artists of the late XIX-early XX centuries: dis. – St. Petersburg State Academy of Arts and Industry, 2006.
5	The Polenovo estate on the Oka River. Owner: V. D. Polenov. Based on it, the main house, the artist’s workshop “Abbey”, outbuildings, services, as well as the Trinity Church and school in the village of Bekhovo were built, where a folk theater was organized for peasants and their children in the village of Strakhovo	State Museum-Estate of V. D. Polenov: Guide / Compiled by: E. V. Sakharova. — 5th ed., corrected. - Tula: Priokskoye Book Publishing House, 1970. - 89 p. E.A. Terkel. Vasily Polenov (Family album of the artist). - M/: State. Tretyakov Gallery, 2019. - P. 18. - 24 p. With.

6	Nidden Artists' Colony. German Bridge Group Die Brücke (1905-1911) Fritz Bleil, Ernst Ludwig Kirchner, Erich Heckel and Karl Schmidt-Rottluff, Emil Nolde (from February 1906 to the end of 1907), Max Pechstein (1906-1913), Otto Müller (1910-1913). a number of foreign artists: the Swiss Cuno Amier (since 1906), the Finn Akseli Gallen-Kallela (1907), the Dutchman Kees van Dongen (1908), the Czech Bohumil Kubista (1911).	Return of cultural heritage: an exhibition of works by artists of the Nidden Colony for the first time in the Russian part of the Curonian Spit. May 20, 2009 // [Electronic resource] URL:http://www.park-kosa.ru/site_news/157.html (date of access: 07/16/23) The artists' colony in Nida celebrated its 15th anniversary.// [Electronic resource] URL:http://artinternational.ru/viewtopic.php?f=45&p=21751 (date of access: 07/16/23) Collection Western European Art - Königsberg Academy of Arts and Nidden Colony URL: https://rusmuseumkld.ru/art-collection/western-european-art/konigsberg-academy-of-arts-and-the-nidden-colony/ (date of access: 07/16/23)
7	Worpswede, "Barkenhoff": artist: Fritz Mackensen, Hans am Ende, Otto Modersohn, Fritz Overbeck, Heinrich Vogeler, Paula Modersohn-Becker, sculptor: Clara Westhoff writers: R. M. Rilke, Hauptmann, Gerhart Gerhart Hauptmann,	Gnedovskaya T. Yu. Colony of artists in Worpswede. History of one community // Art history. 2012. No. 1–2. P. 507–545. Markina L.G., Muravleva E.N., Muravleva N.V. Künstlerkolonie Worpswede Colony of artists and writers Worpswede // Culture of Germany: linguistic and cultural dictionary: over 5000 units / under general. ed. prof. N.V. Muravleva. - M.: AST, 2006. - P. 553. - 1181 p.
8	Ahrenshoop "Künstlerhaus Lucas": "November Group", "Blue Rider", "Bridge"	Künstlerhaus Lucas: a place for the creativity of artists, writers and composers. // [Electronic resource] URL:http://www.paiberdin.org/issues/issue44_rus.html (date of access: 07/16/23) Petrashen E. P. Creative environment. The phenomenon of colonies of artists, dachas and estates of cultural figures // Collection of reports of the All-Russian Conference "Problems of reconstruction and restoration of monuments of historical and cultural significance. - 2011. - P. 101-114.
9	The Darmstadt artists' colony, Mathildenhöhe, was founded in 1899–1914 under the patronage of the Grand Duke of Hesse, Ernst Ludwig (1868–1937). Architects G. Christiansen, J. Olbrich and P. Behrens, Church of St. Mary Magdalene in the “Russian style” (1897-1899, architectL. N. Benois). Artists: Peter Behrens, Joseph Olbrich, Hans Christiansen, Ludwig Habich, Patrice Hubert, Paul Burk, Rudolf Bosselt.	Vlasov V. G. Darmstadt Colony of Artists // New Encyclopedic Dictionary of Fine Arts. In 10 volumes - St. Petersburg: ABC-Classics. - T. III, 2005. - P. 353 Grigorash A.V. Exhibition "Document of German Art" (1901) in the context of the opening of the Darmstadt colony: Gesamtkunstwerk or synthesis of arts? //Current problems of theory and history of art. – 2011. – No. 1. – P. 368-375.
10	Villa Ainola, composer Jean Sibelius. Artists: Akseli Gallen-Kallela, Pekka Halonen	Exhibition “Sibelius and the World of Art”, Helsinki, 2015 Sibelius and the world of art Publisher: Finnish National Gallery, 2014. Editor: Hanna-Leena Paloposki, 277 p.

		They are 150 and they are still popular [Electronic resource] URL:https://finland.fi/ru/kultura-i-iskusstvo/im-150-i-oni-vsyo-eshhyo-populyarny/ (date of access: 07/16/23)
11	Academic dacha of the St. Petersburg Academy of Arts, created in 1884 on the initiative of V. A. Kokorev	Latypova, I. R. Suburban creative bases for artists in Russia / I. R. Latypova, E. Yu. Lobanov // Art criticism and design in the modern world: traditions and prospects: Collection of materials of the All-Russian XIV Scientific and Practical Conference of Young Scientists, Tambov, May 19, 2021 / Editorial Board: I.V. Tatarintseva, V.V. Cheremisin, K.V. Filatova. – Tambov: Tambov State University named after G.R. Derzhavina, 2021. – P. 87-95.
12	Dachas of artists in St. Petersburg: Dachas of Benois and A.G. Rubinstein in Peterhof, "Penates" by I.E. Repin, other dachas in the Kurortny district.	Petrashen E. P., Alferovsky K. A. Leonty Benois and his dacha // Bulletin. Architect. 21 century. – 2021. – No. 1. – P. 46-47. Svetlova M.V. Formation of a sustainable model for the revitalization of the Dacha Benois complex in Peterhof / Mag. dis. St. Petersburg State University, 2019. Grechukhina M.A. The problem of preserving historical and cultural heritage: The dacha of Mikhail Nikolaevich Benois // Historical path of Russia: from the past to the future. – 2021. – P. 366. Benoit A. My memories. – Ripol Classic, 1990. Dacha of composer A. G. Rubinstein [Electronic resource] URL: https://www.citywalls.ru/house20539.html (date of visits: 08.08.2023) Filippova O.N. Museum-Estate of I.E. Repin in Penates //Fundamental and applied scientific research in the modern world. – 2023. – P. 105-112.
13	House of Creativity of the Union of Artists of the USSR and other creative unions.	Budkeev, S. M. Creative dachas in the formation of the style of the artist Mikhail Budkeev / S. M. Budkeev, A. L. Usanova, D. S. Budkeev // Cultural heritage of Siberia. – 2020. – No. 1 (29). – P. 121-131. Latypova, I. R. Suburban creative bases of artists of Russia / I. R. Latypova, E. Yu. Lobanov // Art criticism and design in the modern world: traditions and prospects: Collection of materials of the All-Russian XIV Scientific and Practical Conference of Young Scientists, Tambov, 19 May 2021 / Editorial Board: I.V. Tatarintseva, V.V. Cheremisin, K.V. Filatova. – Tambov: Tambov State University named after. G.R. Derzhavina, 2021. – P. 87-95. Rosenblum, E.A. Artist in design: experience of the central educational and experimental studio of artistic design in Senezh / E.A. Rosenblum. – M.: Art, 1974. – 175 p.
14	Modern Art Residences	POLICY HANDBOOK ON ARTISTS' RESIDENCIES. Open method of coordination (omc) Working group of eu member states experts on artists' residencies. European agenda.

		for culture. Work plan for culture 2011-2014 [Electronic resource] URL:https://ec.europa.eu/assets/eac/culture/policy/cultural-creative-industries/documents/artists-residencies_en.pdf (date of visits: 08.08.2023) Res Artis: Worldwide Network of Arts Residencies [Electronic resource] URL:https://resartis.org/global-network-arts-residency-centres/ (date of visits: 08.08.2023) Digest of creative residences in Russia [Electronic resource] URL:https://www.culture.ru/news/256429/daidzhest-tvorcheskikh-rezidencii-rossii (date of visits: 08.08.2023) Association of Art Residences of Russia [Electronic resource] URL:https://artambassadors.info/data/articles/2023/associaciya_art-rezidenciy_rossii/index.php (date of visits: 08.08.2023)

Fig. 12. Method “Compensation homeostat”

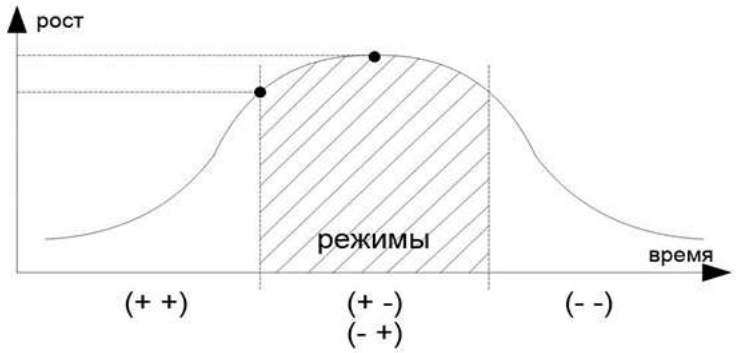


Figure 13. Life cycle of “Compensatory homeostat”

Fig. 14. Model of the functioning mechanism of the Creative Environment.

Table 3. Stages of the "life cycle" of the formation/development of creativity competence through immersion in the Creative Environment.

Mode	*Character interactions*	*Result of interaction*
++	*Element 1, Element 2 - immersion of "Persons" in a new environment, its impact, "Press", stimulates independent development, creative search, intensive exchange of impressions, empathy, generation of ideas*	*"Person 1", "Person 2" - progress, disinhibition, mode of "primary" cognitive process*
+ - - +	*Element 1 - the interaction of "Person 1" with the environment stimulates the generation/testing of ideas and creative search.* *Element 2 - the "Process" scenario determines the degree of participation of "Person 2" in the creative work of "Person 1" as an alternation of distancing and support, along with the independent creative work of "Person 2"*	*"Person 1", "Person 2" - isogress, mode of alternation of "primary" and "secondary" cognitive processes, the beginning of the formation of the "Product"*
++	*Element 1, Element 2 - progress associated with active support of the environment - "Press", success in implementing the idea - "Product", stimulating interaction scenario - "Process", inspiring community - "Persons".*	*"Person 1", "Person 2" - the effect of "connecting to the continuum" allows you to return to the mode of the "primary" cognitive process and disinhibition. Active phase of formation of the "Product"*
+ - - +	*Element 1 - independent work of "Person 1" upon completion of the creation and presentation of the "Product".* *Element 2 - distancing/supporting "Persona 2", positive feedback.*	*"Person 1", "Person 2" - stabilization - isogress, alternation of "primary" and "secondary" cognitive modes;* *completion of the formation of the "Product";* *the final stage of the "Process" gives a new vision of the medium - "Press".*

Table 4. Competencies of an environment designer and their indicators (Active qualities and sub-qualities of competencies), fragment.

OPK-3 *Able to carry out search sketches using visual means and design graphics methods; develop a project idea based on a conceptual, creative approach to solving a design problem; synthesize a set of possible solutions and scientifically substantiate your proposals when designing design objects that satisfy the utilitarian and aesthetic needs of humans (machinery and equipment, vehicles, interiors, printing, consumer goods)*	*K-2 (Artistic and visual competencies)* *OPK-3.1. Able to carry out search sketches using visual means and methods of design graphics and sketching;* *OPK-3.2. Able to depict people in an environment based on imagination, without relying on nature;* *OPK-3.3. Maintains ergonomic and harmonious proportions of environmental elements when depicting from an idea, without relying on nature;* *OPK-3.4. Able to depict in a generalized and recognizable manner various elements of the environment: architectural objects, furniture and equipment, trees, shrubs and herbaceous plants of various types, various types of stone, coatings, construction and finishing materials, etc.;* *OPK-3.5. Proficient in watercolor and ink wash techniques;*
	K-3 (Design Thinking Competencies) *OPK-3.6. Able to generate design ideas using design thinking* *OPK-3.7. Able to develop a project idea using a conceptual, creative approach to solving a design problem;* *OPK-3.8. Able to take into account the utilitarian and aesthetic needs of a person when forming a design idea (in interiors, urban environment, landscape, etc.)*
	K-4 (Architectural and design competencies) *OPK-3.9. Masters the technique of making drawings using traditional drawing tools for hand graphics;* *OPK-3.10. Knows the basics of descriptive geometry, is able to construct basic projections of volumetric-spatial and architectural objects;*
	K-7 (Research competencies) *OPK-3.11. Able to scientifically substantiate and synthesize possible solutions when designing design objects*

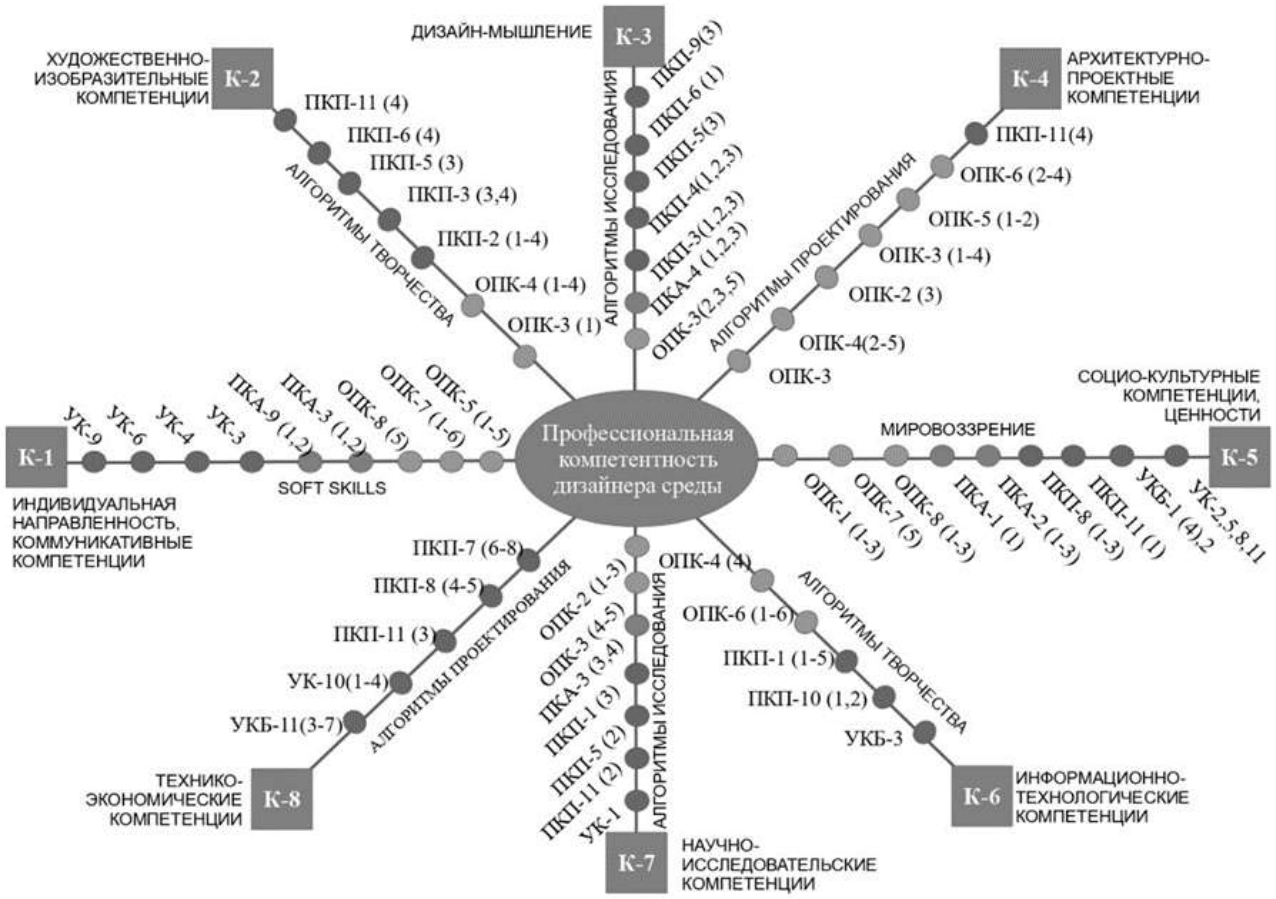


Fig. 15. Logical-semantic model of competence of bachelor and master of environmental design based on St. Petersburg State University's own standard in the areas 54.03.01 and 54.04.01 design. (Competencies are included selectively in the model to maintain readability of the image).

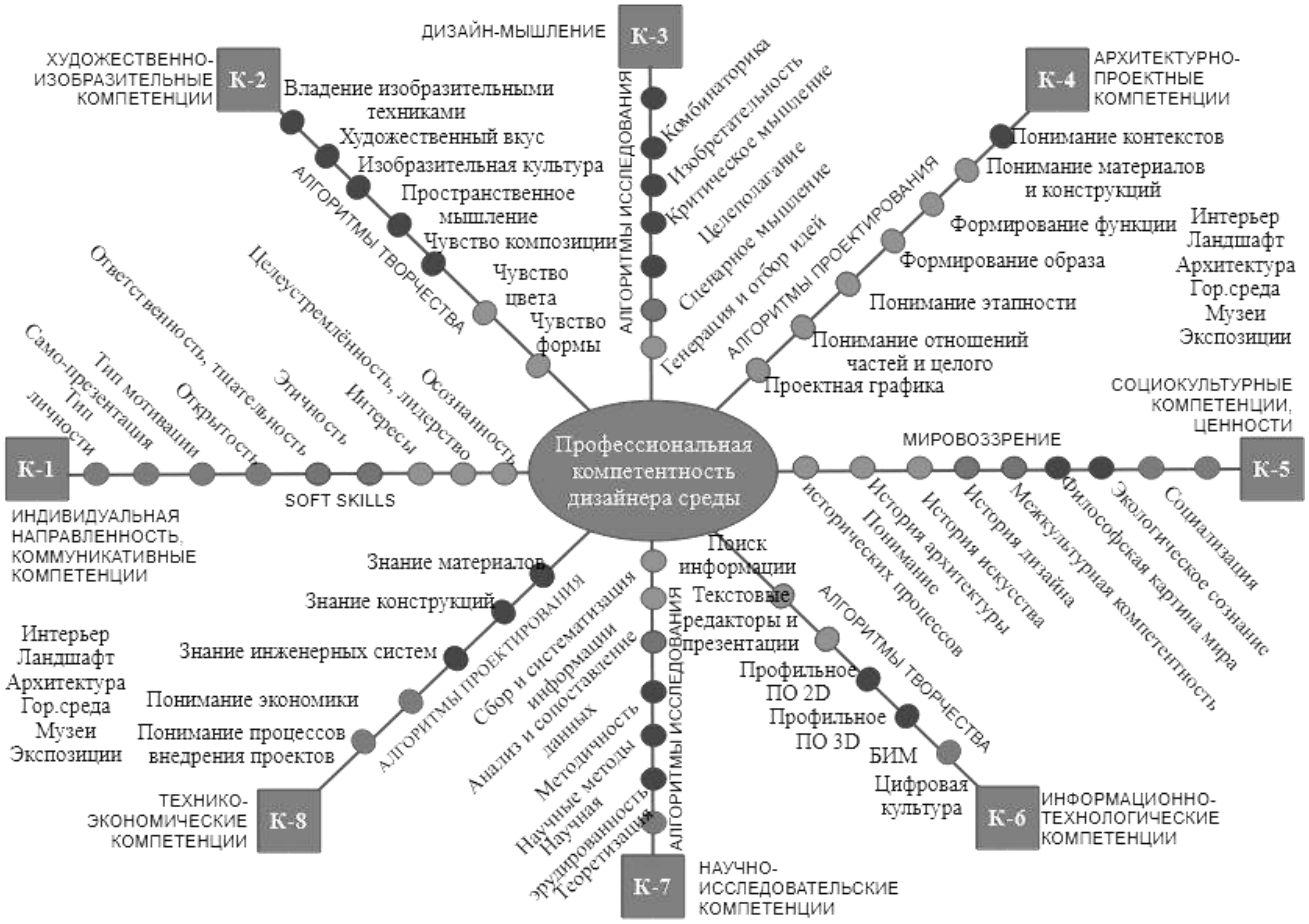


Fig. 16. Logical-semantic model of environmental designer competence, generalized.

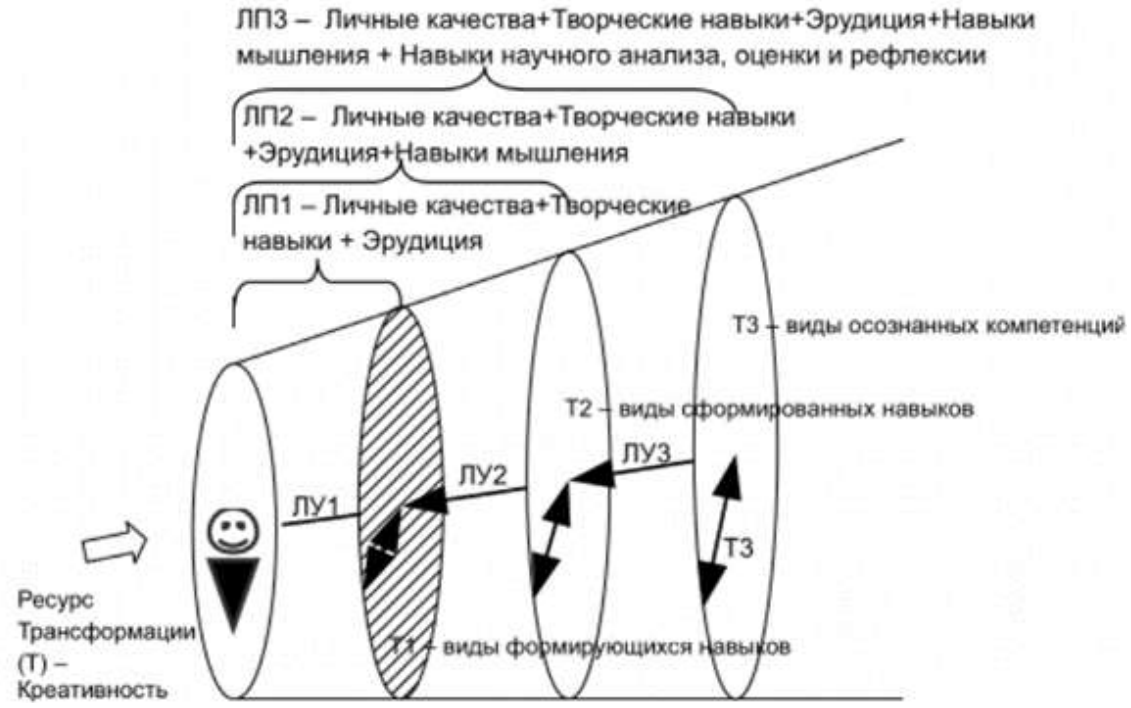


Fig. 17. Conceptual model "Formation of environmental designer competence as an evolutionary process."

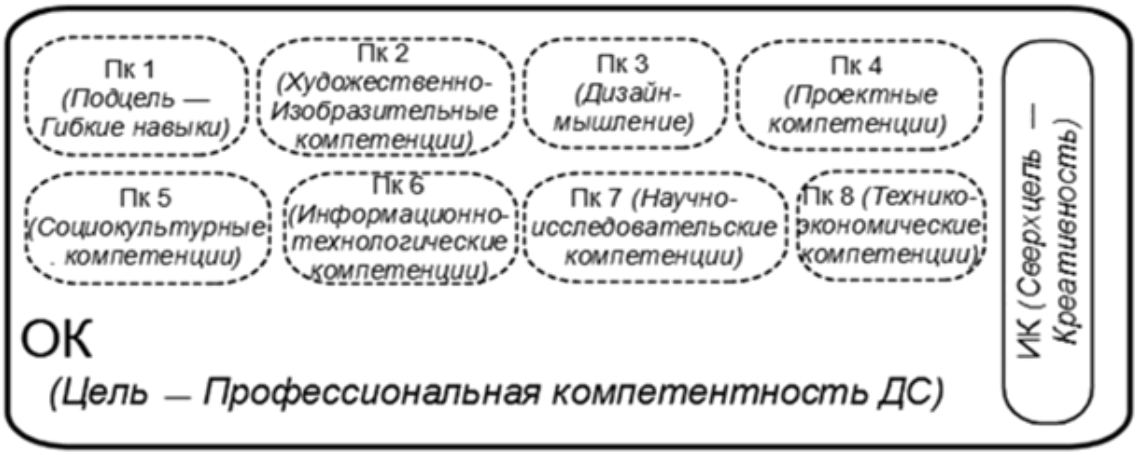


Fig. 18. Model “Active qualities of professional competence of an environmental designer” using the “Order of Goals” method

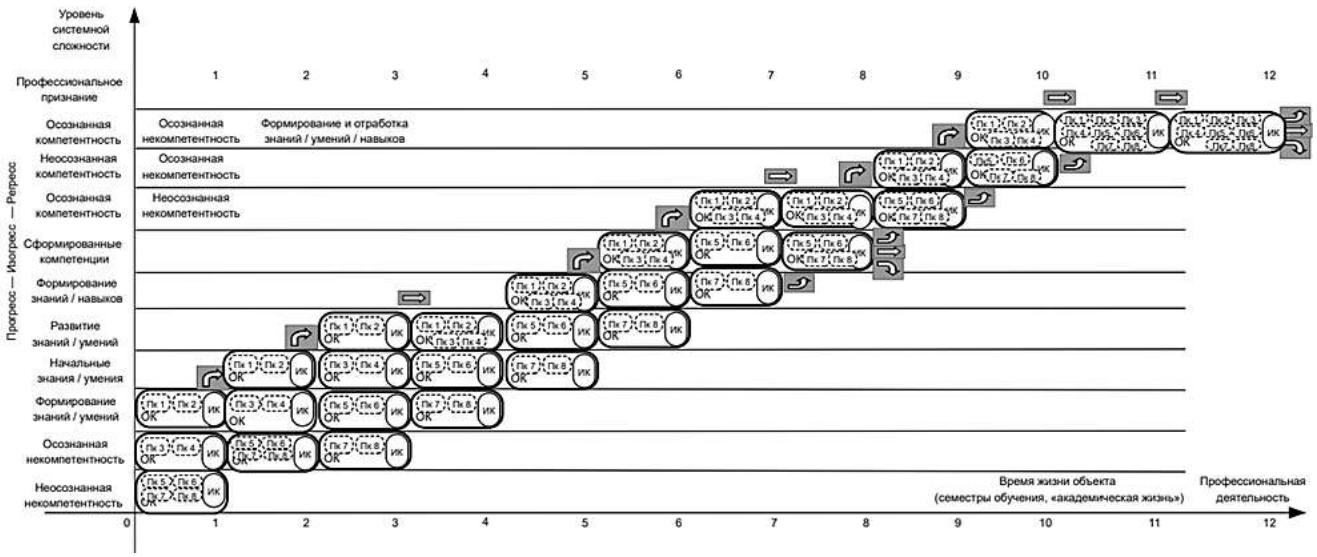


Fig. 19. Conceptual model of the stages of developing the competence of an environmental designer using the “Order of following goals” method.

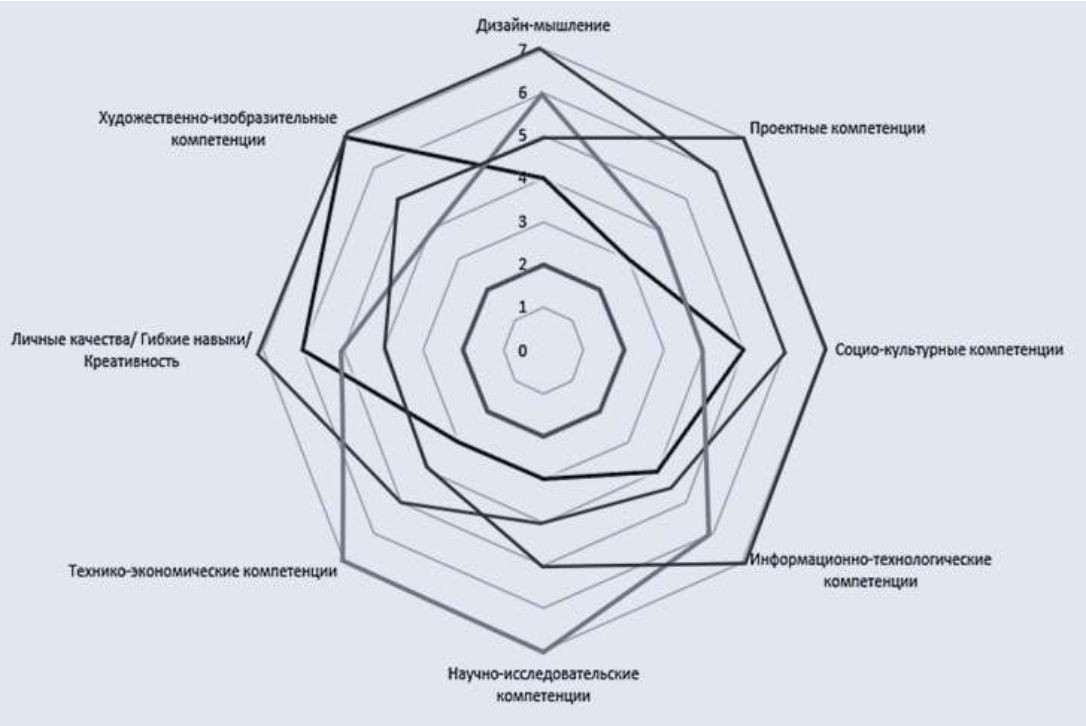


Fig. 20. Model of the “Wheel of Competencies” of a creative team, built on the principle of complementary individual competency profiles.

Chapter 3. RESEARCH AND CREATIVE ACTIVITIES BASED ON THE SYNTHETIC CONCEPT OF ENVIRONMENTAL DESIGN.

Fig. 22. Kosarev Vasily Gennadievich, Historical landscape park Papula in Vyborg, Concept of restoration and development. // Master's degree in design, educational program "Environmental Design", St. Petersburg State University - 2022

Fig. 23. Kosarev Vasily Gennadievich, Topic: Historical landscape park Papula in Vyborg, Concept of restoration and development. // Master's degree in design, OOP "Environmental Design", St. Petersburg State University - 2022 // Analysis of the master's degree using the "Hexagram" method. Step 1, identifying key design challenges and obstacles.

Fig. 24. Kosarev Vasily Gennadievich. Topic: Historical landscape park Papula in Vyborg, Concept of restoration and development. // Master's degree in design, OOP "Environmental Design", St. Petersburg State University - 2022 // Analysis of the master's degree using the "Hexagram" method. Step 2, identifying key vectors for project development.

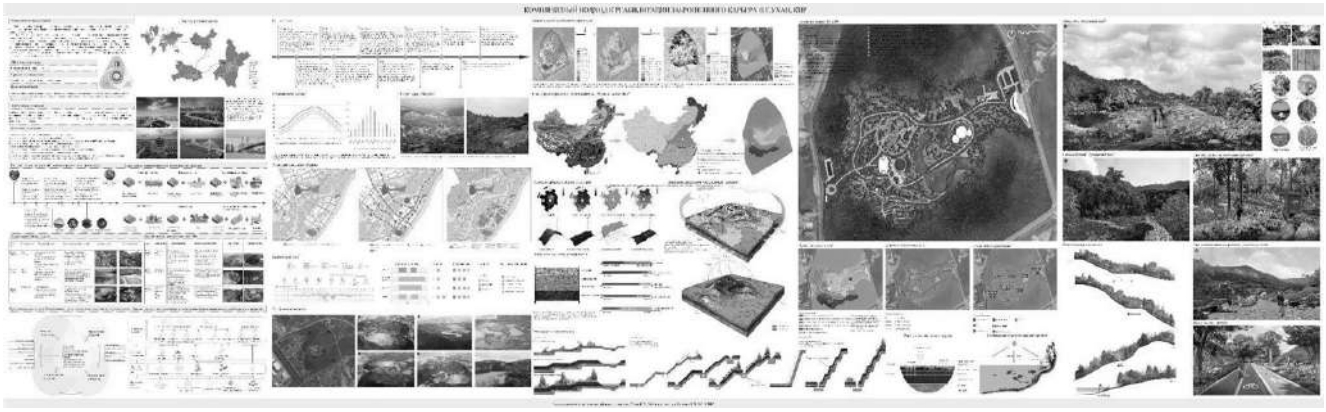


Fig. 25. Li Chunliang. An integrated approach to the rehabilitation of an abandoned quarry in Wuhan, China. // Master's degree in design, educational program "Environmental Design", St. Petersburg State University - 2022

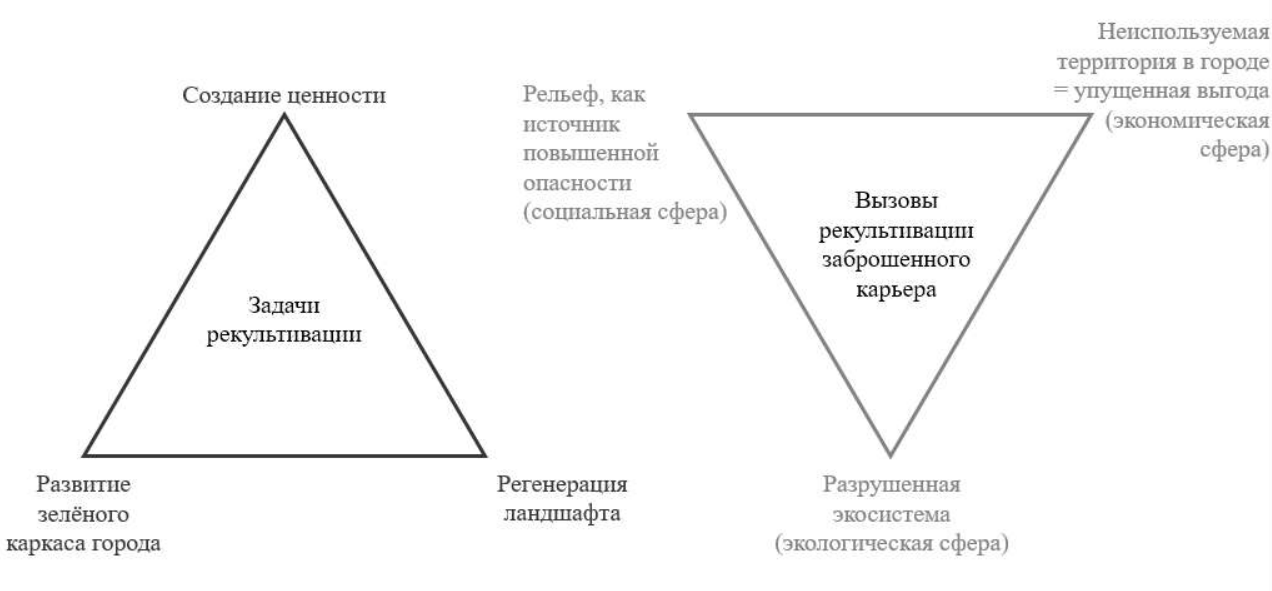


Fig. 26. Li Chunliang, An integrated approach to the rehabilitation of an abandoned quarry in Wuhan, China. // Master's degree in design, educational program "Environmental Design", St. Petersburg State University - 2022 // Analysis of the master's degree using the "Hexagram" method. Step 1, identifying key challenges and obstacles.

Fig. 27. Li Chunliang. An integrated approach to the rehabilitation of an abandoned quarry in Wuhan, China. // Master's degree in design, educational program "Environmental Design", St. Petersburg State University - 2022 // Analysis of the master's degree using the "Hexagram" method. Step 2, identifying key vectors for project development.

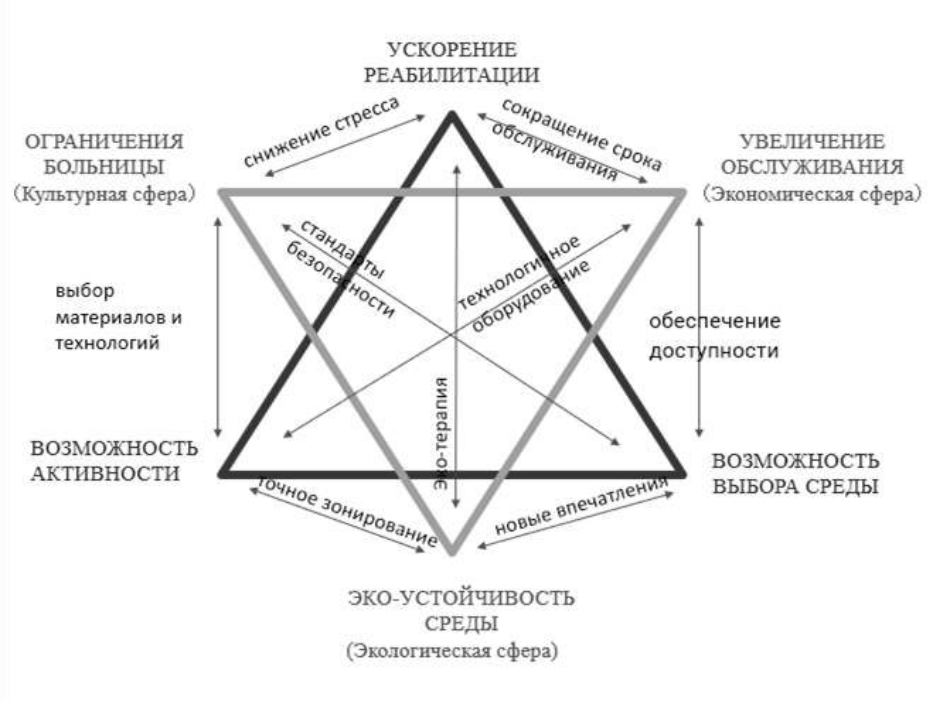


Fig. 28. Shi Mingjian. Theme of the thesis: The concept of the therapeutic landscape of an orthopedic hospital, Zhengzhou, China. The “Hexagram” model as a tool for forming the content of design research.

Fig. 29. Shi Mingjian. Theme of the thesis: The concept of the therapeutic landscape of an orthopedic hospital, Zhengzhou, China. Model "Two-level deciphering concepts" as a tool for forming the conceptual apparatus of design research.

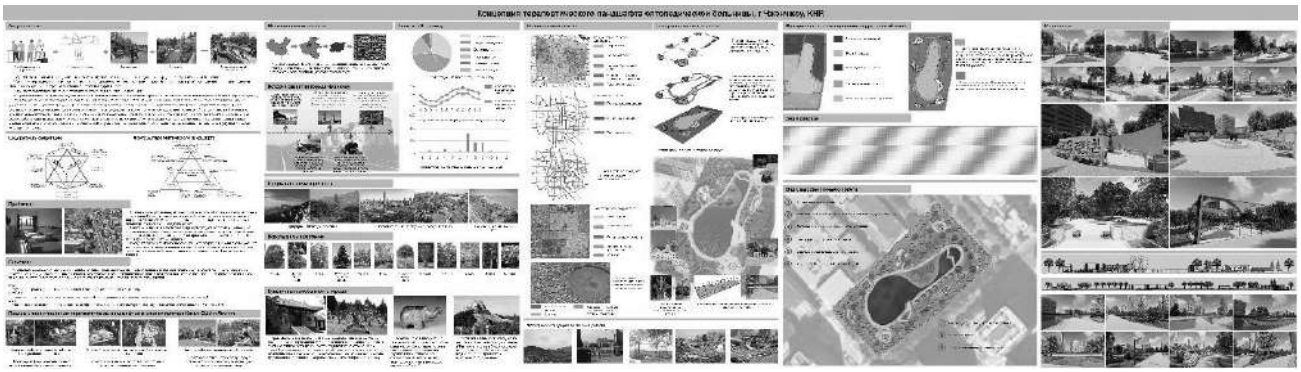


Fig. 30. Shi Mingjian. Theme of the thesis: The concept of the therapeutic landscape of an orthopedic hospital, Zhengzhou, China.

Fig. 31. Liu Xingcheng. Topic: Principles of modern landscape design based on regional culture using the example of the Guest of Honor Hotel in Yancheng, China. The “Hexagram” model as a tool for identifying the content of a design solution.

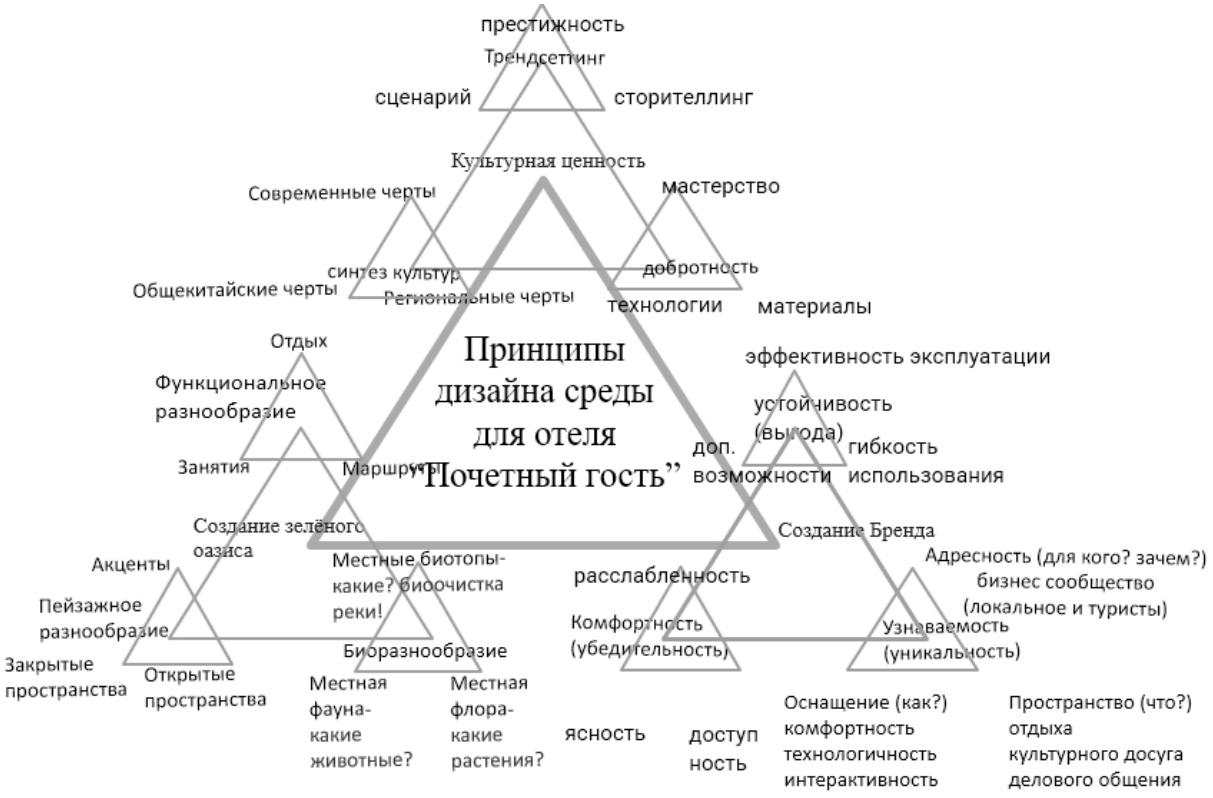


Fig. 32. Liu Xingcheng. Topic: Principles of modern landscape design based on regional culture using the example of the Guest of Honor Hotel in Yancheng, China. The “Three-level triadic decoding of concepts” model as a tool for forming the conceptual apparatus of design research.

Fig. 33. Liu Xingcheng. Topic: Principles of modern landscape design based on regional culture using the example of the Guest of Honor Hotel in Yancheng, China.

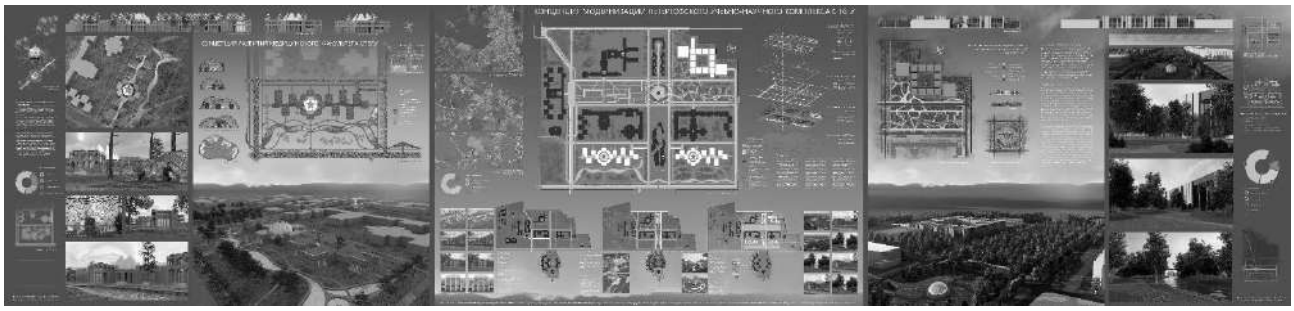


Fig. 34. Concept of modernization of the environment of the Peterhof educational and scientific complex. Bachelor's degrees: Anna Kiseleva, Anfisa Murina. St. Petersburg State University, 2021 Supervisor: Petrashen E.P.

Table 5. Values of assessments in the “design code matrix” for the project for reorganizing the environment of the Peterhof campus of St. Petersburg State University using the example of a synthesis of 5 projects within the framework of the project by Kiseleva and Murina.

1st order contradictions (Min-Max)	*Personal (unique) environment - general (universal) environment*		*Social Comfort-Cultural Comfort*		*Ecological comfort-Urban comfort*		*Person (subject of influence) - Process (interaction scenario)*		*Press (spatial environment) - Product (idea embodiment)*	
Contradictions of comfort 2nd order (Min-Max)	*Designer*	*Urban planning (landscape)*	*Prestigious*	*Relevant, unique*	*Salutogenic/ Natural*	*Giving freedom of choice*	*Actor*	*Organized/Focused*	*Harmonizing*	*Work*

Uncomfortable environment (min-max)							
Absent	*80/20%*	*Everyday (vernacular)*					*20/80%*
Depressed	*50/50%*	*Architectural*			*50/50%*		
Dangerous	*20/80%*	*Safe*					*20/80%*
Inappropriate, unavailable	*50/50%*	*Acceptable, universal*					*20/80%*
Environmentally unfavorable		*Free from hazards*	*80/20%*			*35/75%*	
Scarce	*50/50%*	*Providing for needs*					*20/80%*
Victim	*50/50%*	*Viewer*			*50/50%*		
Compelled	*80/20%*	*Spontaneous*			*50/50%*		
Destructive	*80/20%*	*Transformable*				*35/75%*	
Rejection	*50/50%*	*Positive emotions, experience*			*50/50%*		

Table 6. Values of assessments in the "comfort matrix" for the project of reorganizing the environment of the Peterhof campus of St. Petersburg State University, according to the concept of A. Kiseleva and A. Murina, taking into account the developments included in it by A. Koleganova, E. Byzova, A. Kurochkina, M. Kuznetsova.

Factors of comfort and creativity	*Current state of the environment PUNK SPbSU*	*State of the environment planned by the project*
1. ***Personal environment***	***Absent* 80% - *vernacular 20%:*** *a personal environment is not provided for by the campus project; the only possibility of personalizing the environment is a spontaneous "picnic in the bush" (with an element of marginality) and self-seeding vegetation.*	***Designer* 80%, *Everyday 20%:*** *Various routes and areas for recreation and activities are provided for different target groups, while the possibility of additional personalization in interactive areas remains possible.*
2. ***Social environment***	***Destructive/Architectural 50/50%:*** *the architectural environment looks unfinished and degraded, the landscaping is partly regular and monotonous, partly spontaneous and neglected.*	***Landscape/Architectural 50/50%:*** *the architectural ensemble receives a complete, holistic appearance, green areas acquire a park-like character, public spaces of various purposes and scales are formed, the image: a garden city.*
3. ***Social comfort***	***Dangerous / Safe 50/50%:*** *collapsing tiles from building facades, insufficient lighting, a feeling of emptiness and abandonment against the backdrop of parking lots clogged with cars / lack of obvious social threats.*	***Prestigious / Safe 80/20%:*** *unique modern architectural, design and landscape solutions update the campus environment, visualization of the semantics of faculties increases their significance, fan zones and photo zones increase the attractiveness, accessibility and versatility of the environment also increases its prestige / increasing the attractiveness of the territory leads to increased activity on it in general, which means that risk of reduced security.*
4. ***Cultural comfort***	***Inappropriate, unavailable / Acceptable, universal 50/50%:*** *loss of relevance of the design of the architectural ensemble and its incompleteness, does not correspond to the modern ambitions of St. Petersburg State University as a leading university, does not provide accessibility for international*	***Appropriate, unique/Acceptable, universal 80/20%:*** *corresponds to the status of St. Petersburg State University, has unique modern architectural and artistic solutions, will preserve the continuity and develop the architectural style of the historical part of the complex, developed water and green infrastructure / Historical objects and planning structure have been preserved and restored.*

	students, the neglect of green areas / the functionality of the campus as a whole is preserved.	
5. ***Ecological comfort***	***Free from harmful substances / Salutogenic, natural 80/20%:*** *the ecological situation on the territory does not contain any pronounced threats, with the exception of lack of tree care as a potential threat / there are tracts and individual specimens of valuable healthy trees.*	***Salutogenic, natural / Free from harmful substances 75/35%:*** *provision is made for the preservation of valuable vegetation and the improvement or replacement of poor-quality vegetation, the formation of ground cover and regulation of drainage, and the increase in the compositional value of landscapes. / To form the maximum quality of sustainability and salutogenicity, landscape proposals require further development by specialized biologists, dendrologists, land reclamation specialists, etc. Preservation of min. quality indicators are inevitable for travel and parking areas.*
6. ***Urban comfort***	***Deficit / Needs met 50/50%:*** *the needs of target groups for recreation and leisure are not provided / functional access to facilities and transit is provided.*	***Provides freedom of choice / 50/50% needs are met:****a variety of routes, functional, thematic and landscape zones are provided, walking and interaction scenarios / habitual transits are preserved.*
7. ***Persona*** *(subject of influence)*	***Victim/Spectator 50/50%:*** *target groups are not satisfied, but are forced to put up with the existing situation and observe it.*	***Viewer/Doer 50/50%:*** *freedom to choose a behavior scenario is provided, to observe and "reactively" receive impressions or to be involved in processes of transformation and active use.*
8. ***Process****(interaction scenario)*	***Forced/Spontaneous 80/20%:****the choice is not provided, it is carried out only by the most active "Activists", spontaneously, taking into account the partial temporary transformation of the environment (picnics).*	***Organized / spontaneous 50/50%:****a choice of routes, leisure areas, and viewpoints is provided. Spaces are provided for organizing and holding events.*
9. ***Press*** *(architectural and spatial environment)*	***Depressive / Transformable 80/20%:*** *the modern look causes negative emotions, depression, and disappointment. The possibility of transformation is used to a minimal extent.*	***Transformable/Harmonizing 35/75% up to*** *the "ideal" project could not be finalized due to the draft nature of the master's degree in design, but the proposed concept forms the modern aesthetics of postmodernism, in harmony with the objects of the Soviet period, combined with the environmental orientation and semantic richness of the environment without overload and kitsch, which allows us to give it a high assessment. The process of*

		design transformation itself changes the image of the environment in the eyes of design participants - Doers and Spectators, revealing its potential, giving positive emotions and experience.
10. ***Product*** *(embodiment of a creative idea or positive emotions and experience)*	***Rejection, negative emotions / Positive emotions, experience 50/50%:*** *the existing environment is not perceived as corresponding to its purpose, nevertheless, the scientific and educational process goes on as usual, its results are achieved*	***Positive emotions / creative Product 50/50%:*** *the scenario of the landscape and architectural environment is aimed both at the formation of emotional, sociocultural and educational experience, and at the creation of an intellectual, scientific and creative Product. In case of transformation of the environment, the scientific, educational and educational process will be able to obtain a new, increased quality and productivity, innovation, and creativity. The minimal creative product of a modern student is a selfie against the backdrop of a space or object that evokes delight. In the campus renovated according to the project, this will become a possible and expected reaction to the environment.*

Table 7. Implemented projects of the Eastern Offices of St. Petersburg State University

Thai cabinet	Chinese cabinet
	
Japanese cabinet	Korean cabinet
	

Fig. 35. University seasons – 2022. Festival of thematic student gardens "Rhododendrons in the Garden". "Garden in Alpine style" by the team of environmental designers of St. Petersburg State University.

Table 8. University seasons - 2023. Festival of thematic student gardens “Rose - Queen of the Garden”. The process of creating and presenting an exhibition garden in the English style by a team of environmental designers from St. Petersburg State University.

		
1 Taking the project to scale	*2 Installation of structures*	*3 Planting*
		
4 Planting	*5 Completion of installation*	*6 Defense before the jury*

Fig. 36. University seasons. Festival of thematic student gardens - 2023. Object: “Garden of an English Artist”, team of the “Environmental Design” program, St. Petersburg State University.

Table 9. Educational projects for landscape design of the territory of the Miller's House.

Option 1. Assignment: Base of practices of St. Petersburg State University "Tsar's Mill" (Kovtun A., 2016)

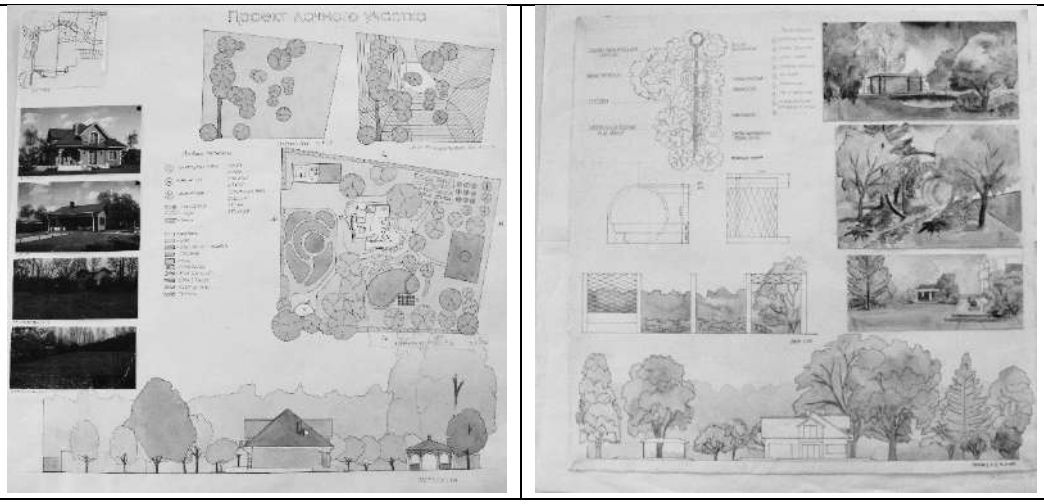
Option 2. Assignment: Personal plot. (Savelyeva Yu., 2017)


Figure 37. Formation of a sustainable model for the revitalization of the Benois Dacha in Peterhof. Master's thesis: Svetlova M.V., 2019, 2nd year, master's degree, educational program "Environmental Design". Scientific Supervisor: Speranskaya V.S., Petrashen E.P.

Fig. 38. Research and creative practice of master's students on the basis of the NCO "Dom-Castle Foundation", Chernyakhovsk, 2012.

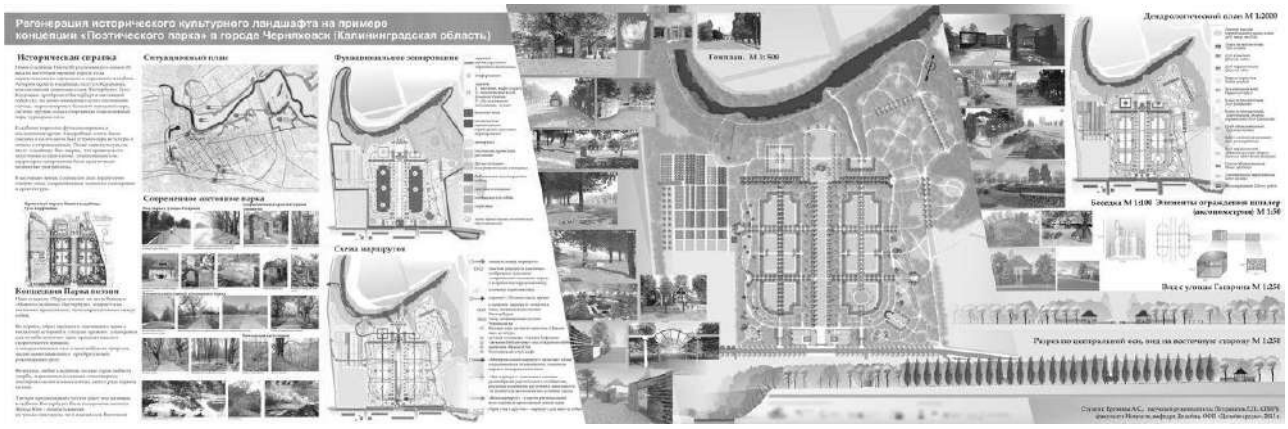


Fig. 39. Master's thesis project based on the results of on-site internships in the Kaliningrad region: "Regeneration of a historical cultural landscape using the example of the concept of "Poetic Park" in the city of Chernyakhovsk (Kaliningrad region)" Eremina A.S., OOP "Environmental Design", 2013.
Scientific supervisor: Petrashen E.P.

Fig. 40. Organization of educational and methodological work to modernize the work programs of academic disciplines based on a system of models for developing the competence of an environmental designer, using the effect of a creative environment; Virtual creative interactive environment based on the Padlet.com platform.

Fig. 41. Thesis of master's degree students of the educational program “Environmental Design”, 2012: “Revitalization of the historical architectural and landscape complex of the base of St. Petersburg State University “Dacha Benois”. (Methods of environmental scenography and eco-design" (master's student Deryugin L., scientific advisor Petrashen E.P.), "Revitalization of the historical architectural and landscape complex of the base of St. Petersburg State University "Dacha Benois": a method of integrating objects of modern architectural design" (master's student Lebedeva E., scientific supervisor Alferovsky K. A. Scientific consultant: Speranskaya V. S.)

Fig. 42. 3D reconstruction of the ensemble of Benois dachas in the village of Bobylskaya. L. Deryugin, K.A. Alferovsky, E.P. Petrashen, 2013

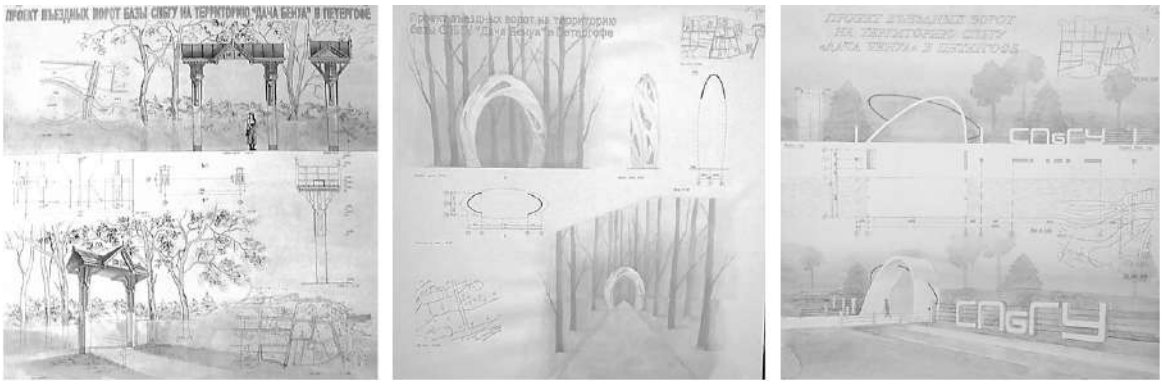


Fig. 43. Gate to the base of St. Petersburg State University “Dacha Benois” 1st year, 2nd semester of study:
A. Koleganova, N. Kotelnikova, A. Kiseleva, 2013-2016.

Fig. 44. Improvement of the territory of the St. Petersburg State University base “Dacha Benois”. S. Melnikova, 2nd year, 3rd semester of study, 2014

Fig. 45. Bachelor's thesis of the educational program "Environmental Design": "The concept of the art residence of St. Petersburg State University in Peterhof" (Wan Li, scientific advisor Petrashen E.P., 2015)

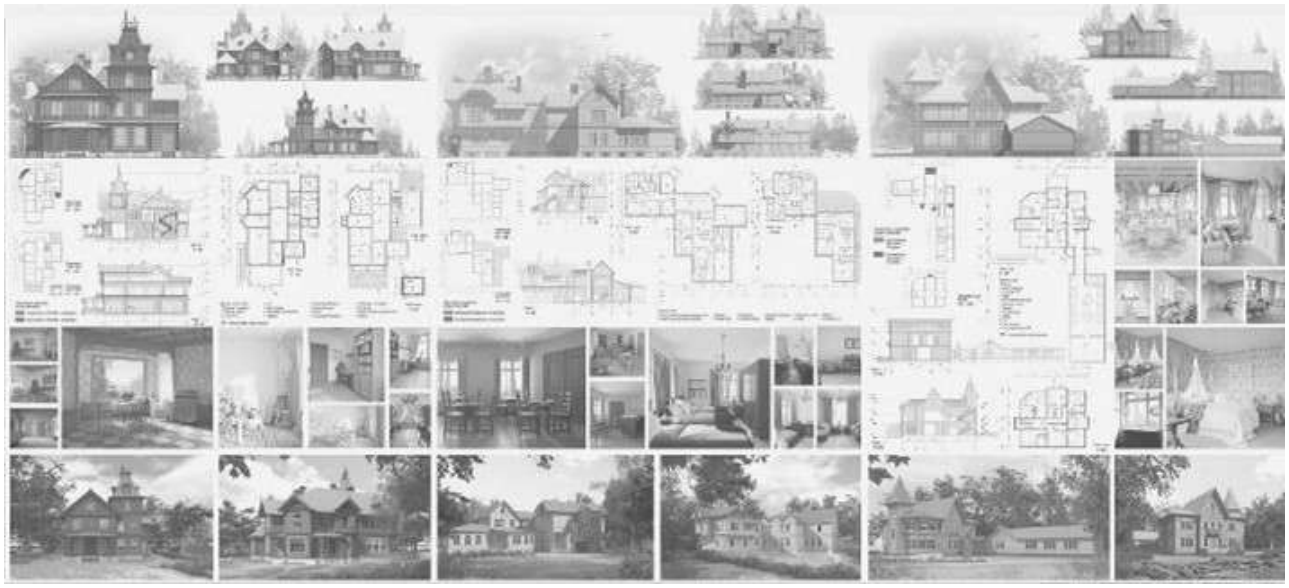


Fig. 46. Thesis of master's degree student of the educational program "Environmental Design": "Formation of a sustainable model for the revitalization of the Benois Dacha in Peterhof", Svetlova M.V., Scientific. Supervisor: Speranskaya V.S., Petrashen E.P., 2019 (Fragment)

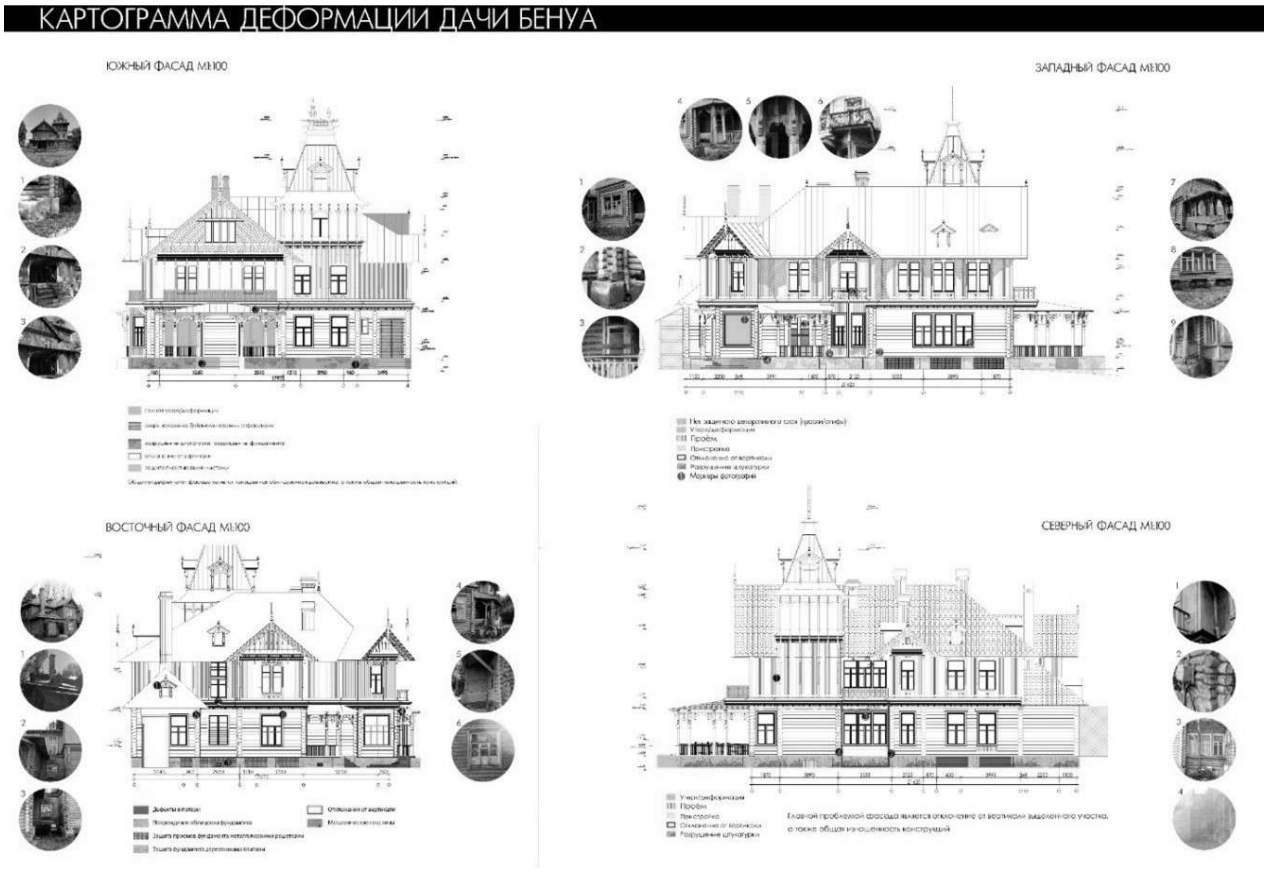


Fig. 47. Results of measurement and restoration practice of SPbGASU students, 2020.

Figure 48. Development of a system of measures for the restoration project "Dachi Benois".

Fig. 49. Integration of the creative environment of the Art Residence into the management system of St. Petersburg State University. Categorical-symbolic model "Expanded homeostat"

Fig. 50. Project GRAND PLEIN AIR Art residence "Dacha Benois" St. Petersburg State University

Fig. 51. Conducting cleanup days and excursions at the Benois Dacha, 2021-2022 (including, together with SPbGO VOOPIK).

Fig. 52. Conducting measurement practice at the Benois Dacha, within the framework of a grant from the Russian Cultural Foundation, together with St. Petersburg GO VO VOOPIK, 2022.

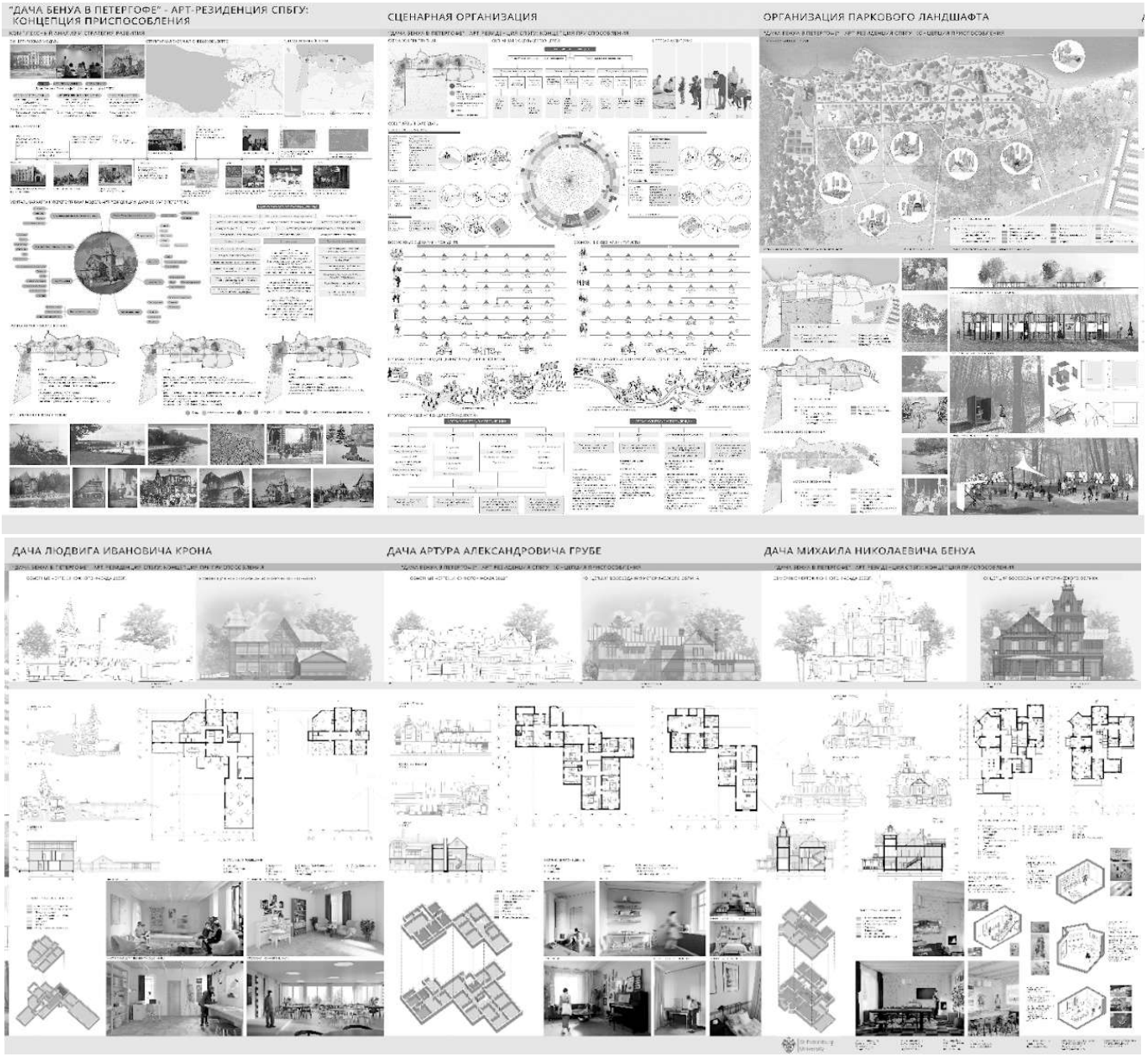


Fig. 53. Development of the concept of the St. Petersburg State University Art Residence “Dacha Benois”. Team of authors: 1st year master's students of the educational program "Environmental Design" of St. Petersburg State University, 2023.

Fig. 54, 55. Exhibition and educational activities of the St. Petersburg State University Art Residence “Dacha Benois”. Exhibition “The Legacy of the Benois Dacha” at the Lomonosov Museum of Local Lore and a conference on the opening day of the exhibition.

Table 10. Interactive model “Wheel of Competencies”. Examples of results of changes in the competence of participants in practices organized using the “creative environment” methodology.

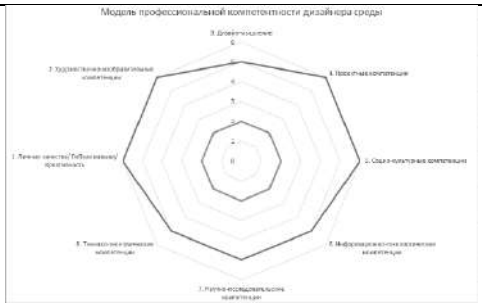
Item No	*“Wheel of Competence” based on pre-practice testing (self-assessment)*	*“Wheel of competence” based on the results of testing after practice (self-assessment)*	*Numerical values*	
			to	*after*
1			*5* *4* *4* *5* *4* *4* *4* *4*	*6* *6* *5* *6* *6* *5* *5* *5*
2			*7* *5* *7* *6* *7* *7* *7* *5*	*7* *8* *8* *7* *7* *8* *7* *6*

Table 11. Interactive model “Wheel of Competencies”. Examples of results comparing self-assessment and expert assessment of competence.

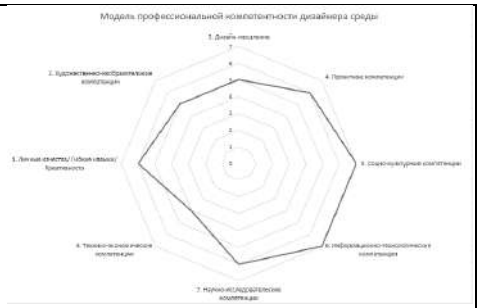
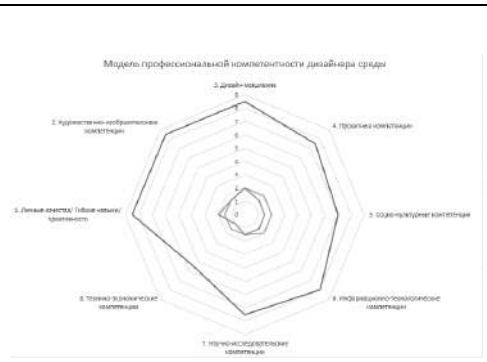
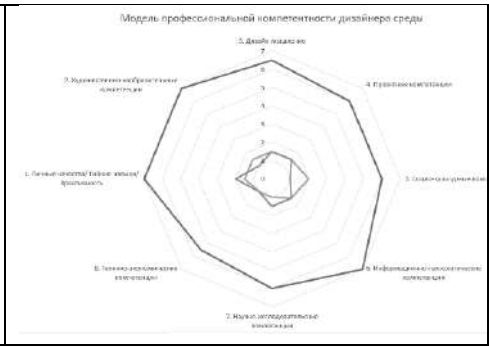
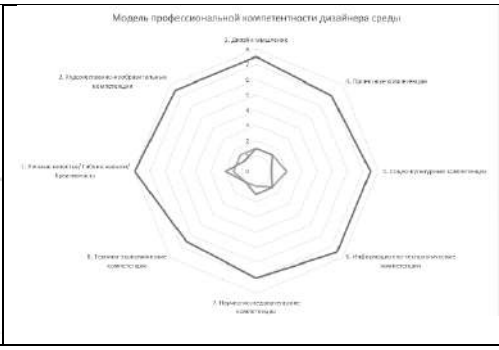
№	*Low self-esteem*		*CO*	*E.O.*
3			*6* *5* *5* *6* *7* *7* *6* *4*	*8,5* *8,5* *8,5* *7,5* *7* *8* *7,5* *5,5*
	Heightened self-esteem			
4			*8* *9* *8* *9* *8,5* *8,5* *8,5* *8,5*	*7* *6* *7* *7* *7* *7* *6* *7*
	Normal self-esteem			
5			*5* *5* *6* *6* *6* *6* *6* *5*	*5* *6* *7* *6* *5* *6* *5* *5*

Table 12. Comparison of the “Wheel of Competencies” of a creative team of 1st year master’s students before and after clinical practice and work on the Art Residence project “Benois Dacha” in a creative environment (expert assessment).

IM *DS*			*7* *7* *6,5* *6* *6* *7* *6* *5,5*	*8* *7,5* *7,5* *7* *7,5* *7,5* *7* *6,5*

APPENDIX 2

PRACTICE MANUAL FOR MUSEUM AND ARCHITECTURAL CLINIC OF SPbSU[160]

A general description of the implementation of clinical practices at the Museum and Architectural Clinic of St. Petersburg State University was developed by the senior lecturer of the Department of Museology and Protection of Cultural and Natural Heritage Objects, A.A. Nikonova. The manual has been sent to print.

Methodology of forming a creative environment when conducting educational and production practices Museum and Architectural Clinic of St. Petersburg State University

The clinical form of practice requires the development of a new methodology, taking into account the characteristics of the areas of study and specific educational programs. As a result of work on the interdisciplinary project "Benois Dacha in Peterhof – St. Petersburg State University Art Residence", a methodology for the clinical form of practice was developed[161], carried out within the framework of an interdisciplinary museum-architectural clinic. It is based on the theory of creativity, in particular on the information model of the functioning of the creative environment, which includes the "4Ps" of creativity, namely the following concepts:

Person – a specific student, a group of students and/or teachers, including curators from a licensed design organization or other project partners, representatives of the employer, target user groups;

[160] URL: https://spbu.ru/studentam/praktika/praktika-po-modeli-kliniki-v-spbgu/muzeyno-arkhitekturnaya-klinika

[161] The section was developed by E.P. Petrashen, based on the article: Petrashen E.P. Formation of a model of a creative educational environment using the "Black Box" and "Compensatory Homeostat" methods // Proceedings of the Russian State Pedagogical University named after. A.I. Herzen. 2022. No. 203. pp. 228-240.

Press – an architectural and spatial environment that has the potential to cognitively, visually and perceptually stimulate the creativity of participants, which may include examples of the results, materials and means of planned activities,

Process– a scenario for organizing activities, providing for the alternation of organized and spontaneous/independent forms of work of participants,

Product - a certain form of embodiment of creative ideas that completes the creative process, including works that are similar, adjacent or related, in relation to the planned results of activity, which are used to inspire and direct the creative Process.

The methodology for conducting clinical practices for training future environmental designers includes the following key elements:

- presence of an interested person or organization – the customer of the project;
- presence of a licensed design organization - project partner;
- creating the effect of a creative environment, taking into account the parameters of the theory of creativity, including:
- positioning the participants – “Persons” – not as teachers and students, but as a single creative team united by a common goal;
- interaction with the environment transformed in the project – “Press”, as well as examples of Products – analogues of the planned result, in the process of work;
- organization of a creative “Process” based on alternating work scenarios using methods for increasing creativity, such as brainstorming, discussion, etc., with independent and spontaneous forms of work organization;
- for complex and important projects, it is necessary to have a significant and prestigious final event with the presentation of the “Product” and providing active positive feedback to the target audience of the project;
- for long-term projects, it is advisable to alternate work in a creative and comfortable environment, as well as work with target groups and/or representatives of the professional community in the process of work, preserving and using all the results of previous stages of design and research for quick immersion in the context of new participants, building their competencies and expertise, consistent and continuous improvement of the “Product”.

The methodology of a creative environment when conducting practices can be illustrated by a series of master classes held as part of the Water Day of the Garden and Flower Festival in Moscow in July 2019.

Over the course of four days, five interuniversity teams with several curators worked on scenarios for visiting the Art Residence Park by different target groups of users, after familiarizing themselves with the results of detailed photo and video recording of the park, and all the necessary information about the project. The development included the route and main content of the excursion, proposals for the forms of entertainment or educational events, and the design concept for key points of the route. At the end of the work, the teams defended their projects in front of the jury and the festival audience.

Work on the project took place on the territory of the "Imperial Garden" gardening Center in a summer tent equipped with a multimedia complex and tables for work, surrounded by garden plants in the presentation area of the Center, which allowed participants to include proposals for the range of plants and landscaping in their projects, having the opportunity to see their examples in in kind. Such an unusual work environment corresponded to the tasks of the Press element of the creative environment model.

Scenario for organizing work, organized on the basis of alternating introductory presentations, question-answer sessions, discussions, brainstorming sessions, independent creative work, including both group and individual work, in a tent and in a natural environment, in a limited period of time with a responsible final event, ensured compliance with the element *Process* creative environment.

Participants in the practice, students from different universities and educational programs, as well as curators-teachers and practicing landscape architects and designers, had different complementary competency profiles, which contributed to the intensive exchange and mutual enrichment of experience, which meets the requirements for the element *Persona* models of the creative environment.

Exposure to the elements *Press* and *Process* on *Person* contributed to the growth of quality. *The product* – project proposal of each team. Examples of the Product

in creating the effect of a creative environment were the project proposals presented at the beginning of the event, developed by previous project participants, as well as illustrations and research cases from bibliographic sources on the topic of work.

Result or *Product:* the work consisted of five concepts of routes and events with corresponding proposals for the design of sites aimed at various target groups, such as: citizens with limited mobility, schoolchildren, families with children of different ages, local historians and specialists in the field of art history, educational and environmental tourists.

The results obtained made it possible to proceed to the development of a project for thematic zoning of the park territory and were used to organize excursions at the site itself.

The next practice, also inter-university, was carried out in close proximity to the site and on the site itself, namely in the premises of the creative workshop of the "Environment Design" program of St. Petersburg State University in the Leuchtenberg Palace, near the Benois Dacha. A special feature of the practice was that three interuniversity teams worked on three different cultural heritage sites located in Peterhof, Zelenogorsk and Sestroretsk[162].

This addition to the organization's methodology, in comparison with the previous example, made it possible to compare the features of design objects, their audiences, potential and prospects for revitalization. In addition, the work program, which lasted five days, included direct visual study of the objects on site and communication with local residents from nearby residential areas and visitors to the site, including conducting a sociological survey to test the concept. The final event was the presentation of the results at the Council for the Preservation of Cultural Heritage at the St. Petersburg Union of Architects, with the presentation of awards to each project in different nominations.

Each new stage of work builds on previous experience and develops it. Thanks to this, each group of students that is involved in its development has the opportunity to

[162] "CITY AND HERITAGE: DIALOGUE AND MUTUAL INFLUENCE." Interuniversity workshop and scientific-practical seminar [Electronic resource]. URL:https://arts.spbu.ru/gorod-i-nasledie-dialog-i-vzaimovliyanie (date of visits: 08.08.2023)

familiarize themselves not only with archival historical materials, but also with the works of participants in previous design stages. This approach allows for prompt “immersion” of the student in a special “creative environment”, the task of which is to maximally stimulate the manifestation and development of creative abilities and interdisciplinary competence of each participant in the practice.

Interdisciplinary project "Benois's dacha in Peterhof – Art residence of St. Petersburg State University"

Project customers: “Architectural Bureau “Heirs of Benois””, acting on behalf of the descendants of the Benois family, St. Petersburg GO VO VOOPIK, within the framework of the program “Volunteer Campus for the Preservation of Wooden Architectural Monuments (Season 3)” with the support of Russian Cultural foundation, St. Petersburg State University as a user of the facility, KGIOP, as a supervisory body of the executive branch.

Project working group: teachers and students of the educational program “Environmental Design” (E. P. Petrashen, K. A. Alferovsky, V. S. Speranskaya, A. A. Tolstova, etc.) with the participation of the Museum and Architectural Clinic and the Heritage Conservation Center of St. Petersburg State University with the support of the project partners.

Practice partners in 2022: Department of Geodesy SPbGASU, Architectural studio ASM GROUP, Local History museum, town of Lomonosov.

Project Description*:*

Restoration and revitalization of the dachas of the former village of Bobylskaya in Peterhof. Objects of cultural heritage: Dacha M.N. Benois, A.A. Grube and L.I. Kron, and Park of the former village of Bobylskaya (Park of the Village "Prosveshcheniye"), which are used by St. Petersburg State University, require restoration and adaptation to modern use.

As a result of research started in 2010 and a number of design experiments, the concept of the St. Petersburg State University Art Residence “Dacha Benois” was developed, which was approved by the Rector of St. Petersburg State University and KGIOP[163]. For the further development and implementation of research and the adoption of measures for the preservation of cultural heritage objects (cultural heritage objects), a decision was made to continue the project within the framework of educational and production practices in a clinical form (museum-architectural clinic) by students and teachers of the educational program “Environmental Design” with the involvement of project partners.

Objective of the project – development of the concept of conservation and adaptation to modern use (creation of an Art Residence) OKN: dacha M.N. Benois, dacha A.A. Grube, dacha L.I. Krone, with territories and services, and VOKN– Park of the former village of Bobylskaya (Park of the Village "Prosveshcheniye").

Project tasks: carrying out comprehensive scientific research and a preliminary design for adaptation to modern use as an Art Residence. Development of the concept of the Local History Information Center (educational museum) as part of the Art Residence,

[163] Petrashen E.P., Speranskaya V.S. Problems and methods of preserving architectural heritage. Complex "Benois Dacha" in Peterhof // Naukosfera. 2021. No. 2 (2). pp. 6-11.

development of a strategy for the implementation of the project, fundraising, organization of work to restore the local history center.

Due to the high complexity and significant volume of tasks, as well as the lack of stable funding, each practice on this topic becomes part of a long-term project, which began with the development of a concept within the framework of a series of WRCs, as well as research by the project initiators.

By 2023, the following work on the project was carried out:

- Photo recording completed;
- Measurement drawings were made manually;
- Three-dimensional laser scanning of objects was carried out;
- Photogrammetry was carried out;
- Measurement drawings of the facades of three dachas were developed;
- Conceptual modeling of the project scope was completed;
- Draft drawings of the project for adapting objects to modern use were developed;
- The selection of equipment elements was carried out.
- Sketch visualizations of the design of key interiors were completed.

When analyzing the methods and results of individual clinical practices as part of the project for creating the St. Petersburg State University Art Residence “Dacha Benois,” several stages can be distinguished.

First stage of work – development of the project concept. For this purpose, an analysis was carried out of options and scenarios for the modern use of OKN and their justification, based on field observations and the study of analogues, as well as marketing potential. This stage also included the collection of archival materials on the design object and preliminary computer modeling of design solutions. In the process of work, individual, independent, and group, organized forms of work of the participants alternated. The advantage of this model was the ability to integrate not one, but several complementary scenarios for using an object, but the scenarios themselves were not fully developed.

At the end of this stage, for the first time, a conceptual modeling of a modern use option was carried out based on sustainable development goals, which made it possible

to develop a sustainable model for the revitalization of the object in the Art Residence format. However, some shortcomings also emerged, in particular, scenarios for the use of the park, outbuildings, local history information center (educational museum), and stages of project implementation were not developed. Also, field studies were not carried out with the required quality. Thus, these tasks formed the basis for organizing the second and third stages of work, becoming topics for a number of master classes and clinical practices, including interuniversity ones.

Second stage of work. Further work on the project was disrupted by the pandemic, and continued in 2022. Thanks to the receipt of a Grant from the Russian Foundation for Culture within the framework of the "Culture Volunteers" program for the third season of the "Volunteer Campus for the Study and Preservation of Wooden Architectural Monuments" VOOPIK, in which the Benoit, Grube and Krohn Dachas became objects of study, the following practice had the necessary funding to conduct full-fledged full-scale surveys, office data processing and creation of a set of measurement drawings and photographic recordings, with the support of the Department of Geoinformation Technologies of St. Petersburg State University of Civil Engineering and the licensed design organization ASM GROUP.

At the same stage, the results of previous design stages and previously carried out measurements were analyzed. The reasons why the measurements needed to be made again were described, namely the deterioration of the condition of architectural monuments and inaccuracies identified in the materials.

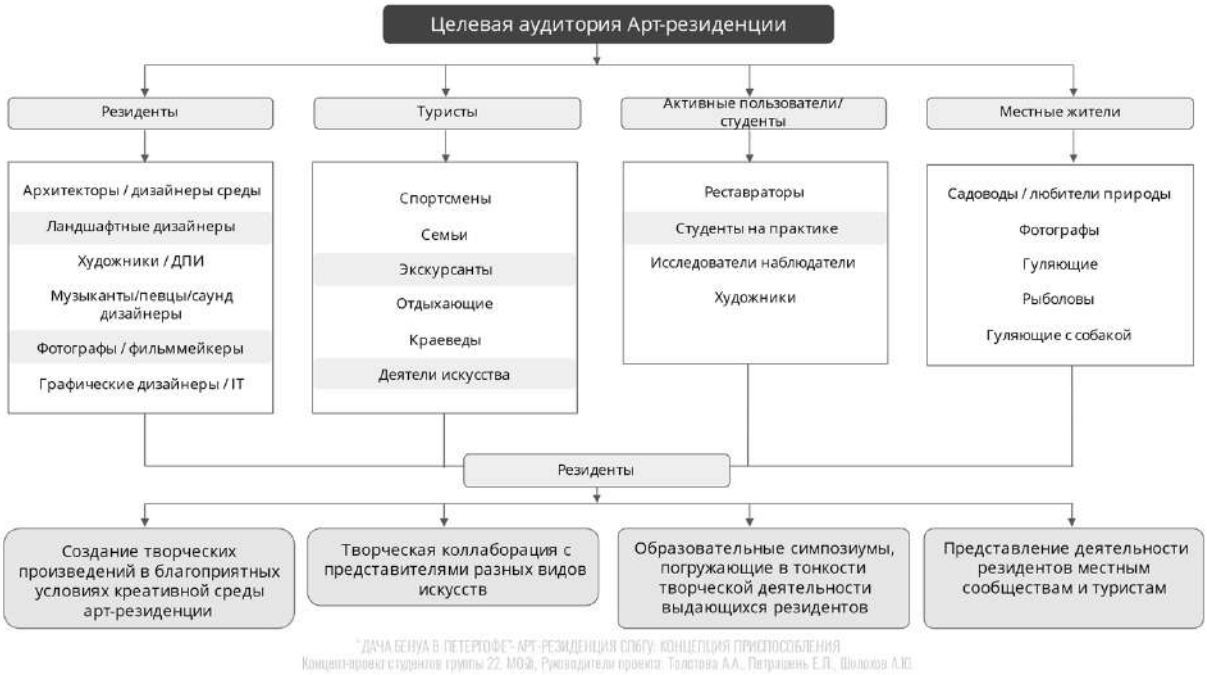
Third stage of work*:* systematization and refinement of the results obtained was carried out during the internship of 1st year master's students. Each new stage of work builds on previous experience and develops it. At the third stage, work on the project is carried out in the formats of workshops, master classes and clinical practices. Thanks to this, each group of students that is involved in its development has the opportunity to familiarize themselves not only with archival historical materials, but also with the works of participants in previous design stages.

Field inspection of the Benois Dacha manually, July 2022.

Field survey of the Benois Dacha with the support of the Department of Geoinformation Technologies of St. Petersburg State University of Civil Engineering, July 2022.

Students and teachers of St. Petersburg State University and St. Petersburg State University of Civil Engineering on practice near the Benois Dacha, July, 2022.

Introductory seminar of the 3rd shifts of practice, September 2022.



Analysis of the target groups of the St. Petersburg State University Art Residence project "Dacha Benois".

October 2022

Each stage of the project ends with a public presentation of the results of the work and rewarding of the participants. The 2022 internship ended with a reporting exhibition and conference at the Lomonosov Museum of Local Lore from March 10 to May 5, 2022. The exhibition "The Legacy of the Benoit Dacha" brought together the works of participants in plein air dachas, the results of measurement practice and project proposals.