EDUCATIONAL STRATEGIES FOR MERGING ARCHITECTURAL DESIGN ART AND ERGONOMICS IN THE TRAINING OF FUTURE PROFESSIONALS

ESTRATEGIAS EDUCATIVAS PARA FUSIONAR EL ARTE DEL DISEÑO ARQUITECTÓNICO Y LA ERGONOMÍA EN LA FORMACIÓN DE FUTUROS PROFESIONALES

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ABSTRACT

The purpose of this study is to explore how a holistic educational approach that synthesizes architecture, design, and art can enhance the training of future architects. In response to global shifts toward digitalization and interdisciplinary practice, the research examines methods that integrate traditional artistic skills, environmental awareness, and advanced technologies such as 3D modeling and IT-based design tools. The methodology involves a conceptual analysis of architectural education frameworks, supported by historical examples and contemporary case studies that illustrate successful integration of artistic and technological domains. The results reveal that combining design thinking with artistic disciplines fosters a deeper understanding of spatial aesthetics, cultural heritage, and user-centered functionality. Furthermore, interdisciplinary learning environments encourage creativity and adaptability, essential for addressing complex urban and ecological challenges. The conclusion emphasizes that effective architectural education must move beyond compartmentalized instruction and instead cultivate a dynamic synthesis of artistic expression, technological fluency, and humanistic values to prepare students for the evolving demands of the profession.

Keywords:

Training, design, Art, IT-technologies, 3D-modeling, education.

RESUMEN

El propósito de este estudio es explorar cómo un enfoque educativo holístico que sintetice la arquitectura, el diseño y el arte puede mejorar la formación de futuros arquitectos. En respuesta a los cambios globales hacia la digitalización y la práctica interdisciplinaria, la investigación examina métodos que integran habilidades artísticas tradicionales, conciencia ambiental y tecnologías avanzadas como el modelado 3D y las herramientas de diseño basadas en TI. La metodología implica un análisis conceptual de los marcos de formación en arquitectura, respaldado por ejemplos históricos y estudios de caso contemporáneos que ilustran la integración exitosa de los ámbitos artístico y tecnológico. Los resultados revelan que la combinación del pensamiento de diseño con

las disciplinas artísticas fomenta una comprensión más profunda de la estética espacial, el patrimonio cultural y la funcionalidad centrada en el usuario. Además, los entornos de aprendizaje interdisciplinarios fomentan la creatividad y la adaptabilidad, esenciales para abordar los complejos desafíos urbanos y ecológicos. La conclusión enfatiza que una formación arquitectónica eficaz debe ir más allá de la instrucción compartimentada y, en su lugar, cultivar una síntesis dinámica de expresión artística, dominio tecnológico y valores humanísticos para preparar a los estudiantes para las demandas cambiantes de la profesión.

Palabras clave:

Formación, diseño, arte, tecnologías de la información, modelado 3D, educación.

INTRODUCTION

Current conditions of development of society, its scientific, technical and artistic potential are increasingly connected with the basic foundations of art as the highest stage of development of the intellectual community. This is most clearly manifested in the field of architecture, design, academic drawing, and more specifically, this is the educational environment, teaching students architecture, design, monumental (interior and exterior) art (Grashin, 2024).

In the structure of world trends in education, all industries use the achievements of IT technologies, artificial intelligence, and the education sector in Russia does not lag behind world trends. A huge number of computer programs exist and provide educational services. Handmade projects have fallen out of the structure of academic disciplines, all curricula provide for the provision of architectural, design, artistic tasks with the help of IT technologies. And these changes are happening rapidly, more and more computer programs appear in all the listed areas, as has already been said, their growth is rapid and inexorable. The quintessence becomes the ability to learn, test a particular program, ensure its legalization in the educational environment, since the educational environment must keep up with trends and thus have time to implement new technologies, endlessly acquiring new IT devices.

Thus, the teaching staff, students, engineers, IT technologists combine their resources to learn new technologies. Thus, the IT industry is developing rapidly, the IT product market is becoming saturated faster and faster, recipients have shorter learning times, and we are not interested in architecture, design, art, we do not care about them, we simply do not have time to reveal the methodological problems of these arts. Having agreed that IT technologies are necessary, useful in the development of society, it is necessary to look at the problem of education, methods of

teaching architecture, design, art, ecology. According to the authors, "full-fledged design training can only be carried out taking into account environmental requirements and standards of both the environmental and architectural environment" (Prishchepa & Burovkina, 2022, p. 3).

The relevance of the topic is discussed in the publications of Bustamante & Cardona (2023), in which she notes the importance of innovative technologies in the educational environment at the present stage. In scientific articles of (Güler, 2021; Osadcha & Baluta, 2021), also notes the importance of ecology in architecture and design in the training of architects. Prishchepa (2013), in his manual "Fundamentals of the Theory and Practice of Design and Decorative and Applied Arts" reveals the main techniques and methods for mastering design technologies of both traditional and innovative software. Prokhorets & Mykhailenko (2022), investigates the development of professional competence in architecture students through creative disciplines. It emphasizes the importance of fostering artistic, graphic, and colorist skills to enhance future architects' creative potential. The study proposes a comprehensive methodology integrating psychological and pedagogical approaches to assess and cultivate students' creative abilities.

MATERIALS AND METHODS

This study adopts a qualitative, interdisciplinary methodological approach grounded in conceptual analysis and comparative case study review. The research draws upon both historical and contemporary sources to investigate the pedagogical integration of architecture, design, and art in higher education. Primary methods include content analysis of academic literature, review of architectural education curricula, and examination of case studies that exemplify cross-disciplinary training models.

Historical examples from Soviet and post-Soviet architectural practice are analyzed to contextualize the evolution of design education in Russia, while international case studies—such as the work of Thomas Heatherwick and the transformation of urban spaces in New York and London—illustrate how artistic synthesis operates in modern architectural projects (Kulagina, 2021). These cases are used to trace pedagogical strategies that bridge traditional drawing, conceptual ideation, and digital technologies such as 3D modeling and IT-based design platforms (Zhitnaya et al., 2019).

The study also includes a critical review of architectural education standards, with attention to how environmental, ergonomic, and cultural factors are addressed in current teaching methodologies. The analysis is informed by the authors' professional experience in architecture and design education, providing an applied perspective on how

interdisciplinary synthesis can be effectively implemented in academic settings.

A critical reflection on the nature of architecture, design, and art across diverse cultural landscapes—such as those of Europe, the United States, and Russia—reveals significant implications for architectural education. In particular, the Soviet experience during the early twentieth century offers a compelling example of how architectural training was shaped by national priorities. The period of accelerated industrialization required the rapid preparation of architects capable of designing hydroelectric power stations, metallurgical complexes, new urban settlements, and strategic infrastructure across fifteen republics (Prishchepa & Vlasova, 2017). Educational programs in architecture were, by necessity, aligned with state-driven objectives, producing specialists with a broad, practice-oriented skill set to meet urgent developmental needs.

This historically grounded model of architectural education emphasized technical proficiency, structural rationality, and monumental scale (Leonov, 2013). It also cultivated a generation of architects whose work contributed significantly to global architectural heritage. However, contemporary educational imperatives have shifted. As many Soviet-era industrial zones have become obsolete or derelict, they no longer serve as viable models for design replication. Instead, architectural education today must confront the challenges of technological advancement, ecological sustainability, and cultural adaptation. The emphasis is moving away from replicating the industrial achievements of the past and toward fostering critical thinking, interdisciplinary collaboration, and creative problem-solving in response to current and future spatial needs (Kiseleva, 2018).

Many residential areas of mass construction require renovation. Accordingly, it is no longer possible to design as before, and a new plan for the monumental and architectural design of the country is needed, as it was in the Lenin period. There is no doubt that this plan must meet all the realities, all the prevailing cultural, economic, and industrial conditions. As Prishchepa (2013), notes, "Art, technology and industrial production have formed a mutually beneficial cooperation, thanks to which art has found many ways of self-expression, and numerous technological processes have acquired an aesthetic appearance. Thus, there was an interpenetration of various fields of creativity and the artist was able to realize himself in several spheres, which formed extremely unstable boundaries of creativity, which was within the competence of high art" (p. 53). It should be flexible, plastic, consistent with the concept and essence of architecture not only as a science, but also as an art. Russian Russian architect P. Fedorovsky developed the idea of a traditional terem in the new style of Russian Impressionism in wood at the end of the XIX -early XX centuries. There are many eclectic inserts, but at the heart of the image is an amazing integrity of artistic architectural completeness with an extraordinary sense of material.

In addition to the amazing carved compositions, traditional for Russia, innovative design solutions for that time were used. Thus, the architecture of K.A. Ton is not only extremely delicate both in the interior and exterior. Consequently, there is a synthesis of architecture with traditional crafts of Russia, with the formation of new environmental solutions, and this is a method of combining design with architecture. Thus, it is possible to trace the trend of architecture's interaction with other types of arts and creative activities. Architecture and design, decorative and applied arts, painting, engineering and much more.

Comparative analysis convinces that modern architecture is a synthesized creativity, and current trends should penetrate the educational environment and form a new creative type of thinking among students of architectural departments (Vavilova & Mantsurova, 2017). The architectural objects of the beginning of the XXI century differ significantly from the architecture of the late twentieth century (Jenks, 2002). They are distinguished by their ideological aspect, first of all it is a demonstration of a new type of thinking, sometimes unexpected, original, humanistic. Deep insight into the essence of what is happening, the realities of life processes, subordination of one's ideas to the problems of society, give rise to a new architectural mission. The mission of architecture is expanding, it penetrates into new spheres of human existence and occupies a leading place. This modern trend is justified by the coherence of actions, a single coordinating center for the development and implementation of new ideas.

Architecture is the face of an epoch, and future generations will judge the achievements of mankind by the trends that existed in the architecture of the past. In 2012, when designing the Olympic Flame bowl in London, Heatherwick Thomas used a message accompanied by the deep meaning of the Olympic Games. These are sports competitions of five continents, friendship games of all peoples of the earth, and this should have manifested itself in the cup of the Olympic flame. Heatherwick's idea was for each of the participating countries to be directly involved in the creation of the project. Thus, 200 horns were designed, which were to be set on fire by representatives of the participating country and placed in a pre–prepared hole, one horn for each country - a symbol of equal opportunities, a symbol of fair competition.

As a result, a giant flower of the Olympic flame was formed - a particle of each country, and when the Olympic flame went out, each country took its horn home as a memory

of the competition. An amazing idea, an amazing object designed by an architect and created by the people and left its image only in the memory of people, and it does not exist, and will not exist, but the architecture of the object exists in the memory of people, it's like music, it's played and it's not there, but it will always be as long as humanity lives. A radically new type of architectural solution, seemingly beyond the creative imagination.

His projects include a mobile folding transformer bridge consisting of certain segments and, when assembled, looks like a round element of the architectural environment. Regardless of the fact that urban transport is not an architectural object, he is the author of a converted double-decker London bus, a newsstand and much more. "We don't do style," Thomas argued, "Every project is a task that needs to be solved as efficiently as possible." Urbanization in the modern world is becoming hypertrophied. The city has ceased to be comfortable for people's lives, urban development is uncontrollable, it is a spontaneous process, the city is expanding, compacting, creeping up and down, dynamically changing and it is not centralized, not subordinated to common sense, humanism and the meanings of human life, but regulated as a factor of salvation, there are ways out of the situation, but cardinal proposals No, it's not.

A person is considering the idea of moving people to the Moon and Mars, to exoplanets. "And the tasks of architecture are not to bring out the same type of skyscrapers, depriving the aesthetic appearance of the city, not to build up every free space, depriving normal living conditions of both humans, animals, and birds. It is necessary to find new formats already in the transformed space, as designers say in "second nature". One such example is the upscale neighborhood at Hudson Yards in New York City. The modern city has required a large number of railway tracks, these are arteries vital for the functioning of the city, they cannot be moved, and it is also impossible to leave a "dead zone" in the middle of the city - a huge spot in the middle of the block covered with sleepers and rails. According to all the laws of urbanism and ergonomics of the city, there should be a city park there. "We can make people feel needed and cared for only with the help of design" (Prishchepa & Burovkina, 2022, p. 3) says Thomas Heatherwick and offers a breakthrough, an absolute new urban park project for architectural and design solutions.

The architect blocked the railway tracks and designed an irregularly shaped sphere from above, along the bridge floors and marches of which people can walk, climbing to different levels and enjoying the cityscape at any time of the day and season. The huge structure fit into the urban void and, like the Eiffel Tower in Paris, it was predicted to have an unsightly future, but the townspeople fell in love

with it, since in addition to the architectural object it was also an art object. Incredible resources for photos against the background of skyscrapers, the mirror image of real objects gives rise to environmental images, unpredictable and new every time. Thus, the synthesis of architecture, design, and engineering aimed at creating a new art object creates a new type of urban environment. "Pure architecture, sculpture, and fashion are boring and unpromising", says Thomas Heatherwick (Prishchepa & Burovkina, 2022, p. 5).

The existence of architectural structures of the past centuries is also a problem for the world community. This is due not only to the restoration and reconstruction of structures of previous years, but also to the operation of these facilities in a new living space. The tasks of the city have changed in many ways, and more and more transformations of certain types of buildings are required for the needs of the city, taking into account the developing new technologies in various industries being introduced into the urban space. For example, for the construction of new highways in Moscow and St. Petersburg had to move houses of early construction with historical and architectural value for tens of kilometers. But in addition to moving houses in an urban environment, there are other difficulties in architectural reconstruction, such as changing and supplementing the functions of old buildings. Very often cathedrals become museums, production halls become galleries. And sometimes there is a combination of functions and an extension of functions, and then the architect faces the task of "how to combine it so as not to disrupt the architectural appearance of the building." So in Westminster Abbey there was a need to use an attic room, which makes up a large quadrature, empty for centuries. There is no access to the attic, it is forbidden to redevelop and create additional staircases.

Taking into account the need to preserve the architectural appearance, Ptolemy Dina proposed to fit a transparent tower into the spans in place of the street toilets that had lost their function, which would not violate the appearance of the abbey. It was necessary to carry out archaeological excavations in the basements, in which many artifacts were discovered, to design a staircase that would fit into the irregular shape of the vacated space with the use of arcbuttons, taking into account the height of the nave, which exceeds 30 m. As a result, in London, a Diamond Gallery with a comfortable, ergonomic separate entrance to Weston Tower appeared in the historical zone while fully preserving the appearance of historical buildings. Richard Rogers, who designed the so-called "inside out building" - the Pompidou Center in Paris, preserving the authenticity of the landscape, which has a special value of the protected area of the valley by the river, designed a distillery that organically fits into Speyside. The distillery is inscribed in

the hills, at their level with an earthen roof repeating the shape of the hills. Speyside was not only a natural heritage of England, but also an architectural landmark, since the distillery is a new sightseeing facility with huge tanks, glass pipelines, liquid flowing in these tanks and entering the valley.

Thus, architecture solves the pressing problems of society, it improves the ergonomics of space, improves the living environment and comfort of people at work, at home, and at leisure. The initial sketch designs were recorded in pencil. The ideas of the future most complex in terms of structural and architectural solutions of objects were depicted on sketchbooks with a simple pencil. Every famous architect is an excellent draftsman. John Simson said that "I feel architecture more when I draw with a pencil."

CONCLUSIONS

The text demonstrates how architecture and design play a vital role not only in preserving cultural heritage but also in fostering innovation that responds to the needs of contemporary society. Examples such as the integration of the Weston Tower in London or the distillery in Speyside show that architectural projects can respect historical and natural environments while creating new cultural and educational experiences. In this way, design contributes to the improvement of ergonomics, aesthetics, and comfort in spaces where people live, work, learn, or engage in leisure. Architecture and design thus become tools for human development, blending tradition with creativity to promote both sustainability and knowledge.

Moreover, the organization of design activities can be seen as a dynamic structure that incorporates science, technology, education, and social values, while being guided by the methodology and worldview of the designer. Just as in education, where theory and practice must interact, design connects creative exploration with practical application, ensuring that projects respond to real human needs.

The designer's activity resembles that of an educator, who must integrate knowledge from multiple disciplines and adapt it to diverse contexts. Both design and education share the goal of humanistic growth, cultivating critical thinking, innovation, and cultural sensitivity. In this sense, design is not only about creating objects or spaces but about generating learning opportunities, strengthening the connection between scientific progress, cultural heritage, and the holistic formation of individuals.

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