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PROJECT ACTIVITIES OF STUDENTS IN TECHNOLOGY CLASSSES

Abstract. The article considers educational design projecting as a stage-by-stage process, which is determined by a clear sequence and coherence of students' design and research actions. The authors of the article focus on the fact that the development of a design concept is a key element of

the creative process, which is formed under the influence of individual psychological characteristics of the individual, in particular, the ability to perform various types of design activities characteristic of design projecting.

Particular attention is paid to the importance of students' design and research activities based on the use of imaginative thinking, productive imagination and graphic control inherent in design activities. The authors show that the use of research tasks in the course of educational design projecting contributes to the growth of students' cognitive independence and creates conditions for their self-development and self-realisation. This approach helps students gain the experience necessary for future professional activities and contributes to the development of their individuality.

Keywords: project-based learning, design and research activity, educational design projecting, creative project, design concept.

Problem statement. The current stage of technological development of society exacerbates the existing contradictions between social needs and the level of organisation of the educational process in general secondary education institutions (GSEIs). Today, knowledge is a priority, because the amount of information is constantly growing and its relevance is rapidly losing. The main task is to be to have a skill to find the necessary information and create new knowledge and experience. This has led to the need for scientists to adjust both goals and objectives, including the technological training of general secondary education students, to determine the specifics of organising the educational process at a high scientific and methodological level and to introduce modern educational technologies and teaching methods that will ensure the development of students' cognitive independence. The Concept of Technological Training of Students of General Education Institutions of Ukraine states that «...the emphasis in education should be shifted from mastering knowledge, skills and abilities for forming the need for knowledge and skills of self-education» [2, p. 5]. The technology teacher is called upon to fulfill this task, as he or she must have a variety of scientifically-based methods for the effective organisation of the educational process. The use of design and research tasks in the educational process, in our opinion, allows us to bring students' cognitive activity closer to the research work of a designer.

Analysis of recent research and publications. The issues of the content and structure of project activities of general secondary education students in technology lessons have been sufficiently studied in the works of O. Kobernyk, T. Machachi, V. Sydorenko, A. Tereshchuk, S. Yashchuk, and others. Scientists consider projectivity as one of the indicators of the level of society's culture, and project activity, in their opinion, is designed to actively involve in solving personal life and professional issues. Research by O. Savchenko and A. Cimbalaru has shown that project-based learning not only stimulates motivated activity, taking into account age and learning interests, but also significantly changes the role of the teacher in the process of managing this activity.

In the works of V. Berbets, V. Burdun, O. Kobernyk, T. Machachi and others, it is shown that students' project activities in technology lessons have a clear structure that provides a systematic link between the didactic goal, motives, educational tasks,

content, methodological approaches and the final result. Scientists believe that the psychological and pedagogical potential of design activities is quite significant, as it effectively promotes the activation and development of students' personalities, meeting their age-related needs and characteristics.

The general problems of design education are comprehensively considered in the studies of O. Henisaretskyi (methodological and humanitarian and artistic aspects of design are defined), V. Danylenko (design as a techno-aesthetic system is studied), V. Sydorenko (design as a culture of design and aesthetics of the creative process of designers is considered), O. Piskun (analysed the didactic foundations of artistic and design training of labour training teachers), N. Znamerovska (studied the training of teachers to develop the artistic and design abilities of applicants for general secondary education), N. Dubova (analysed the importance of artistic and design training in the professional development of future technology teachers), O. Troshkina (studied the initiative of future designers during educational and creative activities), O. Fursa (analysed design education in art colleges), O. Savchenko, A. Tsymbalaru (showed that project activity contributes to the formation of creative qualities of the individual and the establishment of a new format of interaction between teacher and student based on cooperation, openness and trust), D. Kudrenko (a complex of didactic conditions for the formation of artistic and graphic competences of students of artistic specialities is substantiated), V. Sydorenko, V. Tymenko, L. Orshansky (formulated the idea of combining artistic and cultural, educational and pedagogical aspects in the training of future designers of artistic wood processing).

The purpose of the article. In the article, we aim to show that the use of research tasks in the course of educational design projecting contributes to the growth of students' cognitive independence and creates conditions for their self-development and self-realisation. This approach helps students gain the experience necessary for their future professional activities and contributes to the development of their individuality.

Presentation of the basic material. We consider the process of educational design as a creative process that includes several key stages related to the dynamics and patterns of subject-transformative activity of general secondary education students [5, p. 33-37]:

– the initial stage - receiving the task and formulating the problem, analysing the conditions and requirements for the designed object, collecting information on solutions to the problem;

– the stage of searching for a creative idea and design concept – selection and combination of different ideas, narrowing the focus to determine the main direction of design;

– development stage - selecting the best option, refining the design by creating mock-ups, developing structural and decorative elements;

– the final stage - adjusting the product in accordance with the original plans, testing, design, self-assessment, analysis of the results and presentation of the work.

Analysing these stages, we can distinguish three key manifestations of students' design actions that cover all aspects of educational design projection. It is worth noting that the stage of developing a design concept is the most important component of the creative process, as practice shows that it begins long before the development of sketches and drawings. This stage summarises the work done at the preparatory stage and determines the further course of students' design actions at the final stages of educational design projection. The design concept is the central element of a creative project, its essence is to form the main figurative and stylistic idea on the basis of which the details of the design project are developed.

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At the centre of the creative concept is a single, clear and original idea that goes through all stages of the design project. The ability of students to create a design concept on their own depends on the skills of performing certain types of design activities, determined by the design process itself, and indicates the level of artistic, design and technological competence of the author. The role of the teacher is to help the student gain experience in forming a creative design concept. The teacher, using his or her entire methodological arsenal, should direct the student's design and research work in the right direction. This can be done through a system of short-term creative exercises, such as clauses, and design and research tasks, which, in our opinion, will bring the process of educational design closer to the work of a professional design project manager.

V. Moliako's research has shown that the process of solving creative tasks, including by a designer, comprises certain types of mental activity: oriented actions (analysing conditions and formulating a hypothesis); executive actions (choosing optimal solutions); control actions (checking the result of solving the task) [3]. These psychological aspects of the creative process are also reflected in educational design. In the scientific works of O. Kobernyk, V. Sydorenko, T. Machachi, A. Tererschuk and others, it is proved that design and research tasks contribute to the development of students' thinking and the formation of mental activity techniques. At the same time, scientists note that project and design tasks require an integrated approach and involve the use of knowledge and skills from different disciplines.

In addition, the process of understanding artistic and design tasks should be considered in the context of the interaction of objective and subjective factors. Objective factors include the main parameters of the task, the form of presentation, the amount of scientific information and the level of data complexity.

The main factors affecting the process of understanding are subjective factors, such as motivation, individual personality traits and intellectual potential, which

includes information and operational components. The informational component is based on the knowledge and previous experience of the designer-projector, while the operational aspect relates to the ability to use this knowledge in practical tasks.

According to psychologists, the process of comprehending the conditions of creative tasks, including design, is consistently ordered, namely

– familiarisation with the condition or conditions of the task;

– detailed study of individual elements;

– supplementing the information provided with additional data;

– analysis and comparison of the information received;

– correlation of the textual requirements of the task with the drawing and vice versa;

– acceptance of the task for solution;

– comparing the result with the expected one;

– establishing correspondences and differences based on previous experience;

– final assessment of the conditions of the task [3; 4].

As you can see, this process of task understanding is largely based on visual images in combination with specific task requirements. Although the stages of control and understanding are important for any creative process, it is the reliance on imaginative thinking, creative imagination and graphic control that is a characteristic feature of design activity.

Studying the peculiarities of the work of designers, the English scientist J. K. Jones identifies several stages that are associated with the actualisation of the relevant abilities in the design process [1]. The first stage is a divergent search, characterised by comprehensive information gathering. This stage includes the following components: expanding the boundaries of the design situation to find a wider range of solutions, deliberately increasing uncertainty, freeing oneself from predefined solutions, adapting the thinking strategy to new data, combining logical and intuitive approaches, taking into account all possible options (even contradictory ones), and temporarily refusing to evaluate solutions [1, p. 78-79]. At this stage, it is important to maintain an atmosphere of experimentation and freedom of creativity, which contributes to the search for new solutions.

The second stage, which follows the divergent search, is the transformation of the design problem, aimed at simplifying it and making it clearer. This transition from divergence to transformation can occur both consciously and suddenly. J. K. Jones calls this phase «a period of heightened creativity, inspired assumptions and insights» [1, p. 80]. At this stage, goals are formulated, criteria for evaluating the results of design activities are established, and the basic principles and concept of design are developed. The task is divided into smaller subtasks that are solved separately. The ability to transform, as well as to divergence, is ensured by a combination of intuitive («black box») and logical («transparent box») thinking.

The third stage involves the actualisation of the ability to converge, which consists of choosing among alternative solutions to a problem. The main task at this stage is to reduce uncertainty and narrow the number of possible solutions to one optimal one through the use of logical analysis [1, p. 81-83]. This stage requires such qualities as «economy» and «rationality», as well as the ability to quickly find solutions with subsequent objective evaluation.

Conclusions and prospects for further investigations. The stage of developing a design concept is a key in the creative process, and it largely depends on the individual psychological characteristics of the personality, in particular the ability to perform various activities typical of the design process. The teacher plays an important role in helping the student to gain experience in creating a creative design concept. This can be achieved through the use of short-term creative exercises, such as clauses, and design research tasks, which, in our opinion, can bring the learning process closer to the research work of a designer. Since each of the stages of design projecting involves mandatory components of students' design and graphic activity, and the specificity of design activity constantly relies on imaginative thinking and productive (creative) imagination, and is also conditioned by graphic control, further research is needed on the issues of students' graphic activity at different stages of design creativity.

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ПРОЄКТНА ДІЯЛЬНІСТЬ УЧНІВ НА УРОКАХ ТЕХНОЛОГІЙ

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Анотація. У статті навчальне дизайн-проєктування розглядається авторами як етапний процес (початковий етап – отримання завдання та формулювання проблеми; етап пошуку творчої ідеї та дизайн-концепції – відбір та поєднання різних ідей; етап розробки – вибір найкращого варіанту; завершальний етап – коригування виробу відповідно до початкових планів), що визначається чіткою послідовністю та узгодженістю проектно-дослідницьких дій учнів. Авторами статті акцентується увага на тому, що розробка здобувачами освіти дизайн-концепції є ключовим елементом творчого процесу, який формується під впливом індивідуальних психологічних особливостей особистості, зокрема здібностей до виконання різних видів проектної діяльності, характерних для дизайн-проектування.

Особливу увагу приділено важливості проектно-дослідницької діяльності здобувачів освіти на уроках технології, в основі якої лежить образне мислення, продуктивна уява, креативність та графічний контроль, що притаманні дизайнерській діяльності. Авторами показано, що застосування дослідницьких завдань у ході навчального дизайн-проєктування сприяє зростанню пізнавальної самостійності учнів і створює умови для їх саморозвитку та самореалізації. Такий підхід допомагає учням здобути досвід, необхідний для майбутньої професійної діяльності та сприяє розвитку їх креативних якостей та здібностей й творчої індивідуальності.

Ключові слова: проектне навчання, проектно-дослідницька діяльність, навчальне дизайн-проектування, творчий проект, дизайн-концепція.

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