

### To Develop the Creative Abilities of Future Engineers in Textiles

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#### ABSTRACT

*In a crisis of ideas in the domestic light industry, a designer needs to have competencies that allow him to find new design solutions, new ideas, use a range of knowledge about world culture, sociology and ethnography, and be able to communicate with customers. Activation of creative thinking, synthesis of humanitarian knowledge and improvement of communication with the customer helps the ability to carry out high-quality design sketches. Therefore, when teaching designers of light industry products, it is important to pay attention to the artistic and graphic training of students.*

*The purpose of the study is to identify the main problems of artistic and graphic training of students in the development of the creative abilities of future engineers related to textiles.*

**Introduction.** Competition in the world light industry market dictates new requirements for manufactured products. High quality, safe production and harmonious appearance are the minimum set of characteristics that allow the company to be competitive. Today, after a short period of unification, there is again a desire for individuality, a variety of design solutions and forms. Aesthetic requirements for a costume and its semiotic meaning are associated with general trends in culture [1]. Design objects today are whole systems of images, signs and meanings [2]. However, domestic light industry enterprises largely copy foreign mass-market manufacturers, while the trend towards originality, a suit as a reflection of a person's inner world, is returning in world fashion [3].

Thus, today there is a crisis of ideas in the domestic light industry, which means that the development of methods and means for developing creative abilities in the preparation of light industry product designers is relevant. This goal can be achieved by competently organized artistic and graphic training of designers: "... in order to design something, it must be depicted" [4]. The need to use artistic and graphic skills arises in many areas of art, culture, science and production. They are important not only for designers, but also for engineers, designers and technologists. Art graphics acts as a means of understanding the objective world and the environment. For people working in the field of designing material objects, quick sketches serve to fix emerging images, accumulate visual information, which later serves as a kind of "bank of ideas" [5].

Historically, in Uzbekistan, starting from the era of the Timurids, art and engineering education were closely interconnected [6]. Designers of light industry products in Uzbekistan work not only with a technological object, but also design directly the aesthetic appearance of the product [7]. The ability to be creative, to create something new, is an important part of the professional competence of a graduate working on costume design. To work effectively, a designer needs to

have a professional creative imagination: to perceive and analyze the physical data of the customer, to represent the spatial image of the model in the form of a sketch, drawing, to master color, to feel the emotional load of shapes and lines, to master the design culture [2]. It is also important for the designer to develop analytical thinking, since the overall level of professional training depends on this [3]. But for the development of all these qualities, the designer needs to master the basics of artistic literacy.

**Review of literature.** The works of domestic and foreign researchers are devoted to the artistic training of students, whose future professional activity consists in designing objects of the material environment. They consider the areas of application of artistic graphics, its place in the professional activities of designers and engineers, note the importance of manual sketching for the development of professional competencies. So, for example, O. A. Yushchenko gives a classification of artistic and graphic objects in the training of designers and costume designers, based on the creative and communication components of their activities [1]. OA Yushchenko distinguishes between search and presentation sketches; the former being also divided into fore-sketches and logical sequences. The researcher M. G. Nechaev substantiated the significance of a sketch, sketch and sketch in solving the problem of depicting and fixing an idea [2]. Computer technologies, according to him, cannot provide the process of awareness and representation of the depicted object, which sketching gives. Daily sketches, "travel notes" make it possible to accumulate material for further work. The creation of sketches and sketches is aimed at the artistic and figurative perception of reality, a holistic vision of nature, the activation of the processes of spatial thinking and memory, and the relaying of the author's thoughts. A sketch is a kind of visual task that a designer sets for himself. The role of sketches is also given attention in the articles by N. K. Shabanov [2]. Based on the methodology of the systematic approach, the authors for the first time considered the process of teaching drawing as an integral pedagogical system with its own composition, structure and functional orientation.

Foreign researchers also adhere to the idea of the importance of manual sketching, despite the dominance of software methods in design. Subik Kumar Shrestha [6] of the University of Kansas suggests that the use of hand-drawn graphics in design is always an advantage and significant, at least at the initial design stage. He believes that sketches should be an integral part of the design process and be used in parallel with computer software. Shrestha acknowledges the impossibility of accurately measuring a designer's creativity when using sketches, but believes that drawing has a positive impact on the design and thinking process. The same idea is shared by Alistair McGowan and Graham Greene [7]. They argue that the focus of design education on the processes associated with the last stages of the project cycle (production technology, sales) is, in fact, one of the causes of the global crisis of ideas.

**A research methodology.** The study was carried out on the basis of the following methodological approaches: continuity and succession of various levels of art education; reliance on cultural characteristics in describing ways to develop the creative abilities of future textile engineers; an integrated approach to teaching artistic literacy based on the interaction of various types of arts; variable tasks of various levels, adapted to the abilities and capabilities of each student; personality-oriented method of artistic and graphic training of students.

**The ascertaining experiment took place in two stages.** During the first stage of the ascertaining experiment, it was necessary to identify the current level of artistic training of students in the direction of "Designing light industry products", pedagogical conditions, professional requirements for a bachelor of this direction of study. Dissertations related to the artistic and graphic training of students in the direction of "Designing light industry products" and "Development of creative abilities in future engineers, light industry", scientific articles and conference materials were considered. The state educational standard in the direction of study "designing light industry products" and the educational and methodological complexes of the disciplines "drawing and painting" and "artistic and graphic composition" of various educational

institutions of Termez and Tashkent were analyzed.

**The educational conditions were studied on the basis of the study.** Conversations were held with the head and teachers of the Department of Technology and Methods of Teaching Technology of Termez State University, which made it possible to preliminarily determine the problems of artistic training of students. A survey of employers was also conducted. At this stage of the study, the works of students of past years were collected and criteria for their analysis were developed. The analysis made it possible to identify the main shortcomings in the implementation of sketches that persist among students who have completed the development of artistic and graphic disciplines.

At the second stage, based on the developed criteria, the requirements of employers for the level of training of designers and the identified training problems among students of previous years, a set of tasks for the input control of the discipline was prepared based on the development of creative abilities of future engineers, light industry. The received works were analyzed, the main problems of preparation were identified. To conduct a formative experiment, tasks were developed to increase the level of artistic and graphic training of students. They included exercises on technique and exercises related to solving simple design problems, and were developed in accordance with the specifics of the artistic and graphic component of the activities of designers of light industry products. The educational process was built on the basis of the principles of personality-oriented education, individualization and humanization of education.

The control experiment included a slice of knowledge and skills in the course of preparation and the performance of reporting work by students. The learning outcomes were compared with the results of students from previous years and the results of the input control, which made it possible to determine the effectiveness of the proposed tasks.

**Research results.** Before taking measures to improve the artistic and graphic training of designers of light industry products, it was necessary to determine the level of this training and identify the main problems. For this purpose, an ascertaining experiment was carried out. The experiment included conversations with teachers, surveys of employers, analysis of students' graphic works made in different periods of study. The teachers noted that, despite the engineering training of students prevailing in the learning process, the ability to make high-quality sketches is necessary for visualizing ideas, presenting the visual component of a future project. Employers also noted that today's small businesses need designers who can offer new product designs, and the most appropriate way to present ideas is to display them graphically.

The analysis was carried out over the past five years, as well as current work. Based on the identified problems, it was required to develop a block of diagnostic materials for three groups of students to correlate their input results with the results of students from previous years. Works of students were collected on the basis of "Development of creative abilities of future engineers, light industry." To assess the quality, it was necessary to develop criteria based on the specifics of the implementation. Designing a weaving product is a complex phenomenon, therefore, when creating sketches, it is necessary to take into account a number of factors: readability, understandability of images, their aesthetics, psychological comfort during perception, etc. should be complex. For each criterion, the work should be evaluated separately - this is what allows the student and the teacher to record information about the strengths and weaknesses of the work, analyze the growth or, conversely, the loss of skill, and adjust further activities. Based on this, three groups of evaluation criteria were identified: criteria for the quality of performance, criteria for the adequacy of performance to the tasks and cultural patterns, and the figurative component. The assessment took place at three levels: at the technical level, at the creative level and at the conceptual and design level.

The score for each criterion ranged from 0 to 3 points. High compliance with the stated criterion - 3 points, average - 2 points, low - 1 point, impossible to determine - 0 points.

When evaluating the work of students of previous years, the percentage of students who scored an average of 1 to 1.5 points - 59%, from 1.5 to 2 points - 21%, from 2 to 2.5 points - 10%, more than 2.5 points - 0%, which indicates a low level of artistic and graphic training of students who completed the development on the basis of the development of creative abilities in future engineers, light industry

During the analysis of the work, the following shortcomings were identified:

- insufficiently correct location of the object in the sheet format and discrepancy between the size of the object and the format (a sketch that is too small or does not fit into the format);
- at the technical level: poor quality of work with a line and a stroke (discontinuity, rubbing, crossing a stroke at an angle of 90 degrees), unpreparedness of tools (blunted pencils), misunderstanding of the characteristics of the material (attempts to make shading with a hard pencil), violation of the anatomical structure of the human figure, unreasonable the absence of body parts when depicting a person (explained by the inability to depict them), the inability to work with volume, tonality and the transfer of the materiality of the fabric;
- on a creative level: lack of stylization as such; sketches are incomprehensible, it is difficult to imagine models from them;
- at the conceptual and design level: discrepancy between the shape of the objects of the declared functionality and semantic load, misunderstanding of the task, secondary solutions (the sketches are copied from models of existing collections of famous designers).

Based on the analysis of the results, a set of tasks was developed to determine the input level of artistic training of students in the direction "Designing light industry products". The tasks were directly related to the direction of training. Students were asked to complete sketches of costumes in a limited time period, since quick sketches allow you to evaluate not only the result, but also the progress of the work [6]. When performing each task, special attention had to be paid to one of three levels: technical; creative; conceptual design.

The first task was to develop a sketch of the autumn ensemble for the student and, first of all, to identify the features of students' preparation at the technical level. The second task was devoted to the development of a sketch of an evening dress and involved an assessment of the creative level of performance. The third task, issued individually and involving the solution of a problem, was aimed at identifying preparation at the conceptual and design level.

According to the results, the average score from 1 to 1.5 was received by 62% of students, from 1.5 to 2 - 26% of students, from 2 to 2.5 - 12% of students.

When comparing the works of a group of students who completed the work, the same shortcomings in the implementation of sketches were revealed. Thus, we can conclude that the current training in the field of artistic graphics is ineffective.

The main problem, without the solution of which it is impossible to improve training in other criteria, is the insufficiently high level of technical skills. Lacking technical tools, students are unable to perform high-quality stylizations and express their design ideas. At the same time, the desire to achieve compliance with the real form, realism, materiality (with high-quality training, this skill is brought to automatism) does not allow students to pay attention to figurative expressiveness, creative problem solving.

Since students of the "Design of light industry products" direction are dealing with the implementation of quick, short-term sketches of products, their artistic training should be focused precisely on obtaining those skills that will allow them to visualize design ideas with high quality. In addition, the implementation of quick sketches is important from the point of view of awareness of actions and the development of motor skills, the development of specific graphic thinking, the ability to analyze visual information at various levels. This position is

confirmed by the analysis of scientific literature on this topic.

Thus, teaching the development of creative abilities of future engineers, light industry should be focused on the creation of precisely various types of art and design graphics - both because this is an important stage in the work of designers, and because fluent sketching, conceptual sketches and short-term drawings stimulates creative thinking.

To conduct a formative experiment, we proposed tasks related to the professional activities of designers. In order to improve the quality of student training, it was decided to divide the educational process into a sufficiently large number of thematic blocks, including a significant number of short-term tasks, since tasks of a different plan and content, different organization of classes liberate students and allow them to show their artistic abilities [3]. Project assignments - clauses - were included as a way of conveying the original idea in the form of an outline. Tasks were developed that improved exactly the skills needed to create quick preliminary sketches and imaginative, aesthetic, persuasive presentation sketches. The tasks were built with an increase in the level of complexity and requirements for detailing.

Tasks have been developed related to the display of the shape of objects, in particular silhouette and linear (including one continuous line) images of objects - so students can concentrate on conveying the general form. Repeated sketches of draperies and clothing elements allow you to explore ways to graphically display the properties of fabrics.

At the end of the first semester of training, a feedback survey was conducted. Although contact and discussions with the students were maintained on a regular basis, the survey revealed the main difficulties of the students. The questions were formulated in such a way that it was possible to determine the students' self-esteem, their subjectively expressed feelings and problems.

The results of the survey showed that students are interested in more tasks related to styling and design. They believe that the course has improved their skills, but they note uncertainty in the performance of work and, in general, assess the quality of their work as low, even if objectively there has been an increase in the quality of work performance. They noted that they had previously experienced a feeling of fear of a "blank slate" and found it difficult to transfer the idea to paper. Certain difficulties were caused by the organization of independent work of students, their self-organization, which was noted almost unanimously.

**Conclusion.** The study revealed that the low level of artistic training of students in the development of creative abilities of future engineers, light industry, their lack of experience in artistic and graphic activities are problems that are quite difficult to solve in the course of a short course of academic drawing and painting, and additional research activities. It was determined that the artistic training of students in this direction should be directly related to their professional activities, that is, aimed at teaching search and presentation sketching.

As a result of the analysis of scientific literature and the data of the ascertaining experiment, a variant of the organization of artistic training of students was proposed, which includes short-term sketches, sketches and design assignments.

Evaluation of the final works, comparison of the works of students of the current year with the works of students of previous years showed that the level of artistic and graphic training of students has increased significantly. They also improved their results in comparison with the results obtained during the entrance control tasks. Short-term assignments, sketches from life and creative sketches of various kinds stimulated the professional imagination of students, allowed those who had practically no drawing experience to overcome their insecurities. In addition, it was noted that students were able to apply their sketching skills to demonstrate their design ideas in other disciplines. However, the proposed program was not effective in terms of organizing students' independent work. This problem requires further study and search for possible

solutions.

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