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DEVELOPMENT OF TECHNOLOGICAL COMPETENCIES OF TECHNOLOGICAL EDUCATION STUDENTS

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Abstract
In the article there elucidated that in technology lessons, students are exposed to the existing structural elements in determining the components of technological thinking, which are the basis of developing and teaching students, and in addition, for the first time, four new components of technological thinking (thrift, affordability, diversification, critical analysis) were proposed, and as a result of their consideration, effective and it has been shown that they are important components in having a high-quality technological solution.

Keywords: Technique, technology, development, thinking, structure, organization, conceptuality, figurativeness, practical, operativeness, technical language, thriftiness, consumer requirements, critical analysis, garment technology, design.

Introduction

Development of technological competences is considered to be the core and driving force of the didactic method, which ensures the effectiveness of training and intellectual development of future technology teachers. Since the components of the above technological thinking are common to all technology subjects, we applied them to the teaching process by planning training on the subjects of the

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technology of sewing articles in technology. In this direction, we developed and put into practice a didactic system of problematic and knowledge-oriented questions and tasks as a didactic tool aimed at developing technological thinking in harmony. Moreover, the necessary and important aspects of each organizer of thinking are emphasized in the sewing technology classes, methods such as brainstorming, absurdity, lack of information or saturation, new options, limited time, discussion seminars, projecting and various modeling with the help of computer programs were used for their development. The following can be cited as examples of the necessary and important aspects of each of the founders of technological thinking in training on the technology of sewing products, as well as various questions and tasks aimed at their development.

Conceptual component refers to the formation of technological concepts related to tailoring, that is, lining, corset, sketch, collar twist, yoke, cuffs, starch and similar concepts. As an example of tasks that lead to the development of this understanding, it is possible to propose the determination of the necessary details for the correct processing of transfer collars. Students increase their level of independent knowledge by relying on the concepts of lining, starch, in addition to bringing a transfer or imagination to their eyes while solving the task.

The figurative (image or shape based) component helps embody the shape of the object before the eyes and serves to reflect their various changes. For example, the role of the imaginative component is important in choosing the appropriateness of suit pants for different seasons or choosing the style of different types of clothes to look beautiful according to the body and movements. As a task aimed at developing this component, determining the most suitable structure of a jacket for a thin person and finding a solution to a task such as expressing the stages of its sewing technology, the student can confidently start work only when he has an idea of a whole suit, taking into account the sequence of preparation of the jacket from the collar to the waist. We see that the development of the component of imaginative thinking plays a key role in such a matter.

Practical component. It serves to ensure that the theoretical information corresponds to the practice. Within the scope of this component, it is necessary to specify the main parameters of the materials and the calculation of cutting and

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sewing, and it is necessary to prepare a sewing product that can satisfy all requirements without defects. For example, when finding a solution to the task of creating a technology for making a jacket for thin or fat people, the student deviates from the standard technological sequence for a thin person, performs each sewing detail with separate calculations and achieves their matching in practice, contributes to the development of practical thinking.

Technical language component. Figures such as model, drawing, shape, scheme in sewing reflect a certain meaning and serve to understand the essence. As a suitable assignment, it may be required to offer a picture of all the drawings and models for making a women's dress, explaining what they mean and how to use them. Correct understanding of drawings helps not only to perform the task effectively, but also to understand the principle of implementation of the stages of the technological process by perceiving those in the image and to develop the technical language component of thinking.

Efficiency component. The whole process of tailoring focuses on determining the status of their growth or decline, the supply of various required components and materials, and the timely determination of necessary stocks. A task for the development of this component might be as follows. Determine the causes of the defect, such as the formation of slack in the seams during the sewing process. The solution of this task is based on the analysis of all previously learned knowledge and information related to the field, students independently identify the cause and quickly eliminate it.

Thriftiness component. Designing technological activities for the preparation and design of sewing products provides for the focus on lowering the cost of products at all stages of the activities and the resources used. Tasks such as determining the most optimal indicator of how much gas, different components, electricity and other types of expenses are actually spent on a certain style of a product will help the student to determine all parameters using computer programs, to learn to make a product based on savings in accordance with the cost of the product and the market economy, and to think in this way serves to develop the component.

The affordability (making best-selling) component ensures that the garment products created on the basis of technological activities satisfy the current fashion demands of the public, are affordable, comfortable, light, charming and attractive

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in design. In order to develop such a component of thinking in the activity of creating sewing items, the tasks given to students are multifaceted and include both objective and subjective factors. In particular, it envisages that each item should be a fashion collection project, type and composition, creative use of innovative computer technologies in their design, and practical testing of prospective plans in harmony with the times. Any task given based on such requirements will greatly help students to develop this component in their technological thinking.

The development of a diversification component helps to quickly start a new activity, using the multi-functionality of the types and elements of sewing machines in the existing technological activity, when it is necessary to change the technological activity of tailoring and design. It is intended to work with elements that provide a technology system suitable for seasonal clothes, products prepared for events, holidays and contests. The task was to determine which tools would be most effective in making the components of seasonal sewing items. In order for students to find a solution to such a problem, it is necessary to have basic knowledge about the types, functions, parameters of sewing machines, compatibility with the type of fabric and energy efficiency. The development of this component will be of great importance when they learn to use modern machines with computer programs designed to perform each element of the desired item, that is, from the collar to the pocket, in a separate sequence.

The critical analysis component focuses on developing the constituents of technological thinking in harmony, ensuring that each of them is not neglected in technological activities. The high quality and high quality of the sewing product is ensured by the joint development of all components. The critical analytical component of thinking is very important, and in such situations, the critical analytical component of thinking is important for students to solve by reviewing the actions of each technological stage in groups when finding solutions to problems such as identifying the defects of the manufactured product and where to take what into account.

In addition, test tasks of various levels aimed at the development of each component of technological thinking were developed and put into practice on the topics of sewing technology.

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On the basis of the above practical and methodological recommendations, the students of Namangan State University have been given practical sewing training for the past several years and have had good results. Creative works of students won prizes in local contests and exhibitions. In addition, in 2016, the creative works of our students were shown at the international exhibition held at the European University of Flensburg, Germany, and at the "Long Night of Science" international exhibition held at the Dresden University of Applied Sciences in 2019. This exhibition was held within the framework of the joint international project "Business ethics with the example of sustainable textile production" (relevant certificates are available).

Besides, creative works of our students were discussed and received positive feedback at the seminar held at the German-Jordanian University of Management in Amman, Jordan (relevant certificates are available).

Furthermore, in order to determine the practical results of the proposed didactic tools and the methods that develop technological thinking, which are the basis of developing and teaching future technology teachers in the field of technology science, attention was initially paid to the following situations.

Today, it is not enough to develop the professional training of technology teachers. It is necessary for them to know the essence of development and training and the methods and means of its purposeful implementation. Taking into account the relatively new nature of technology in the educational process, practical educational seminars were organized for future teachers of technology in higher education, didactic teaching tools similar to the above were offered for their practical use, and the conditions, goals, and tasks of conducting pedagogical experiments were determined in them, in which many years of technology subjects were taught, shortcomings identified during the training process were also taken into account.

The main purpose of the pedagogical experiment is to identify the problems that arise in the formation of the modern outlook on the development of technology in the development and teaching of technology classes and to solve them, it consisted of checking the effectiveness of the methods of teaching technology based on the use of didactic tools consisting of educational methodological

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recommendations, tasks and problems, and informational computer technology programs aimed at the development of technological thinking.

Pedagogical experiences are in three stages, the first stage in 2015-2018 at Namangan State University, the methods of teaching technology, the real situation of theoretical and practical training, and the development of technology in solving the problems identified on the basis of them, the development of all components of technological thinking in the course of direct technological activities and the development of information technologies the need to use technological activity programs was determined and the technology teaching methodology was improved based on them.

In the second stage, in 2018-2020, an experience of studying technology educational materials was held. Tests were conducted to study the development of technological thinking of students in the process of teaching technological sciences in secondary schools at Namangan State University, Andijan State University and Karshi State University, using the content of educational topics, didactic teaching tools and improved teaching methodology.

In 2021-2022, control experiments were conducted in the third control phase. The experimental and control groups were taught topics on the technology of sewing products, and the results of the pedagogical experiment were statistically analyzed (Fig.1).

According to the analysis of the results of the pedagogical experiment, it was found that the knowledge, skills and abilities of the students in the experimental group involved in the research process were effective compared to the students of the control group. Student's and Pearson's methods were chosen to perform statistical analysis in the objective assessment of this situation. This method is able to determine and objectively evaluate the indicators recorded in two groups. According to the essence of the mathematical statistical method, at the initial stage, the statistical indicators recorded in the experimental and control groups were defined as samples, and a diagram was created in order to create variation series according to the evaluation indicators.

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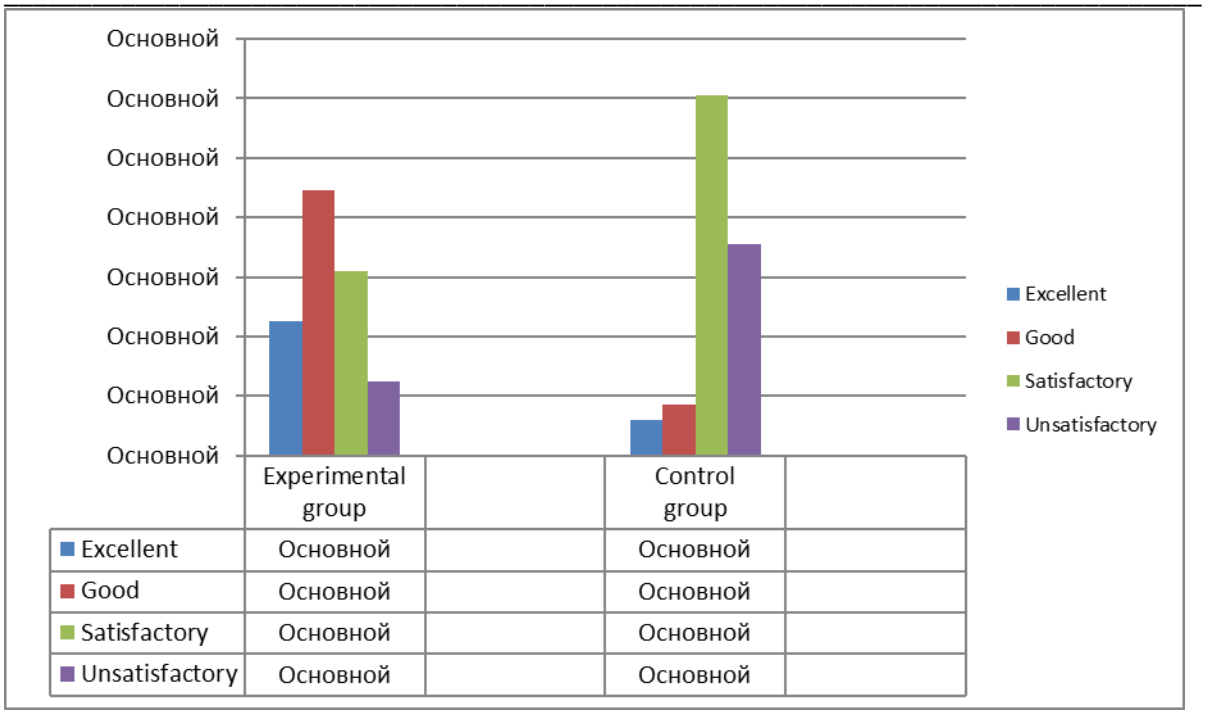

Figure 1. The final diagram of the pedagogical experiment and test work on the teaching method by developing the components of technological thinking in the study of technology classes.

From the diagram, it can be seen that the high and medium scores in the experimental group are higher than those of the control group.

Table 1 Achievement rates of experimental and control group students in the sewing technology course

	Experiment group	Control group
Grade value	5 4 3 2	5 4 3 2
Number of relevant grades	45 89 62 25	12 17 121 71
Arithmetic mean value of grades	$X^*_T = 3,7$	$X_H = 2,8$
Efficiency coefficient	$\eta_1 = X^*_T / X^*_H = 1,32$	
The reliability interval of X	$3,69 < X^*_T < 3,73$	$2,78 < X_H < 2,82$

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According to the results of the general pedagogical experiments conducted on the basis of the developed methodical recommendations, it was observed that the effectiveness of the teaching methodology based on the methods and didactic tools that develop technological thinking in the process of teaching technology is high, and the quality of education has increased by 34%. Students should be able to find solutions to technological problems as a result of the development of all thinking components as a criterion of the development of technological thinking, to be able to analyze the working principle, structure, components and composition of a technological object, to be able to use computer programs in the process of technological activities, and to be able to justify the novelty of a technological problem, their own activities, and results, and situations such as drawing conclusions were defined.

Conclusion

The scientific and practical innovation of the research is that for the first time, it was shown that the development of technology has increased in the current stage, has passed to technological development, and that the current development is connected with technological development, and it is necessary to develop technological thinking in technological sciences.

In technology classes, in order to determine the constituents of technological thinking, which is the basis of developing and teaching students, developing the structural constituents of technical thinking, for the first time, four new constituent components (thrift, consumerism, diversification, critical analysis) were proposed for the first time, and their consideration is effective and high-quality technological It was determined that the components are of great importance in having a solution.

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