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Features of formation the project- technological competence of the future teachers of technologies in the process of studying the basics of design and modeling

Formulation of the problem. Improving the quality of education is considered an important issue not only for Ukraine, but for the world community as a whole. The solution of this problem is possible through reforming the content of education, improving the coordination methods and technologies of the educational process, as well as certainly reviewing the goals and results of teaching.

The essence of the professional training of the teacher of technologies is conditioned by the scientific field "Technology" according to the following principles:

- conditions of social and scientific-technological progress in production;
- modulating the content of the disciplines;
- formation of facilities and skills, which is the basis of the essence of professional activity of specialists;
- deep professional training of the teacher with preservation a single production base (*State standard of basic and complete general secondary education*, 2011).

When considering the newest direction of the Bachelor level in the field of Technological Education, it is possible to conclude that its structure includes disciplines directly related to project activity (Tsveyk S. D, 2010), in particular, the discipline "Basics of design and modeling".

Practical teaching activity demonstrates that in this case the final content has not been established; the logical and sequential order of the topics of classes have not been established, as well as the methodology of forming project-technological competence based on the activity of the teacher of technologies. Therefore, it is necessary to provide a theoretical justification and to develop the appropriate methodological support for the formation of project-technological competence of future teachers of technologies in the process of studying of the basics of design and modeling.

On the other hand, the current transformation of the Ukrainian higher education system is aimed at free movement of the future professionals in Europe and around the world, which requires the preparation of young people for the ability to learn and to improve themselves in order to develop professional skills.

One of the methods for solving these issues was the introduction of the project method into the educational process. This shows us the relevance of the problem of project-technological competence formation in the process of preparing future teachers of technologies.

Preparation of students in higher education institutions for project activities are foreseen in the process of studying of most disciplines. However, the most favorable conditions are created when studying the basics of design and modeling.

The purpose of this article is to determine the nature and substantiation of the need to form the project-technological competence of the future teachers of technologies in the process of studying the design and modeling, enabling them to live more harmoniously in information and technology-rich society and more effectively realize their intellectual potential.

Analysis of recent research and publications. Various issues of content and methodology of preparation the teacher of technologies are devoted to the research works of M. Korets, T. Kravchenko, V. Kurok, V. Madzihon, O. Kobernyk, L. Orshanskyi, V. Sydorenko, V. Steshenko, V. Tereshchuk, D. Tkhorzhevskyi and others.

Moreover, the main interest is given to the methodology of designing products by students in technology classes. The problem of preparing the future teacher of technologies for project implementation remains little considered.

Various aspects of the problem of competence of professionals and students were explored by Ukrainian and foreign scientists – L. Vashenko, O. Lokshyna, O. Ovcharuk, O. Pometun, A. Khutorskyi and others.

Despite the considerable amount of research, the question of forming the project-technological competence of the future teachers of technologies in studying the basics of design and modeling remains open.

Presenting the main material. Society is unable to act in the absence of the production of material amenities, livelihoods of people, carried out in a specific way. Public production includes all, without exception, the spheres of human and social life. In producing material goods in a certain way, a person produces an appropriate way of life, because the way of production is a certain type of life of the individual. The basis of each production is technologies and technological process (Marchenko S. S., 2011).

The leading direction of realization of the new content of labor training, as emphasized in the State standard of the educational field "Technology", is a project-technological activity that integrates all types of modern human activity: from the emergence of a creative plan to the realization of the finished product (State standard of basic and complete general secondary education, 2011).

In this context, it is necessary to build project-technological competence of the future teachers of technologies when studying the basics of design and modeling. At the same time, the content of the course should provide students with a thorough understanding of the basic aspects of design and modeling processes, types of educational design, phases of project cycles, conditions of management, organization, implementation and evaluation of design and project activities, to get acquainted with the possibilities of the newest design to promote the creative development of the future teacher of technologies.

It should also be remembered that the program of student's preparation includes the gradual preparation and implementation of

creative projects, technologies of processing of structural materials, landscape design, decorative and applied art, modeling and designing of clothes, interior design (Tereshchuk A. I., Kobernyk O. M., 2006). In turn, these components of the program require changes in the content and methodology of forming the project-technological competence of the future teachers of technologies in learning the basics of design and modeling.

Therefore, it is possible to define the following tasks that face the discipline in the process of forming project-technological competence:

- the development of originaive abilities and creative thinking;
- mastering a modern terminological base with project-technological activity and skills to use it in the educational process;
- basics of project activity in real production;
- studying the competencies for practical readiness for project activity;
- formation of general project and technological skills;
- students' acquiring of project-technological competence;
- prompting the students to develop motivation to use the newest technologies.

In order to effectively solve the set tasks, the educational material should be selected with the following principles:

- the interdependence of educational content and level of society development;
- availability;
- honesty;
- science;
- sequence;
- expediency and relevance of tasks of profile preparation of students;
- perspective;
- the satisfaction of individual cognitive students' interests;
- the professional orientation of the content of the educational material, its connection with the future profession;
- the necessity for educational material.

The main purpose of learning the project-technological competence in the process of studying the basics of design and modeling is:

- gaining and development by students the theoretical basics of design and modeling;
- mastering the methods for solving project tasks;

- forming students' ability to perform design and modeling tasks in freely available computer programs (CAD – Computer Aided Design Systems).

Studying students through design and modeling contributes to the development of professional, socially valuable knowledge and skills and creates the conditions for the development of their creative abilities and, consequently, project-technological competence.

The Program of Student's Education defines the project as grounded, planned and conscious activity aimed at creating a specific system of creative intellectual and subject-transforming knowledge and skills (*Teacher's professional competences and capacities*, 2016).

The main tasks to be accomplished in the design are identified as:

- argumentation and object selection;
- the development of the design and technological process;
- product manufacturing;
- evaluation;
- economic and marketing research;
- environmental analysis;
- defense of the project.

Based on the analysis of these tasks, it is possible to trace the influence of design on the process of forming the project-technological competence of the project of the future teachers of technologies.

As the basics of design and modeling related to the compulsory subjects of professional training of the future teachers of technologies, it is necessary to consider the essence of the process of formation of project-technological competence at the classes of this course.

The most common organizational forms of studying the basics of design and modeling are lectures, laboratory and practical classes. The transition to personality-oriented, development-oriented learning requires a new form of lecture preparation. In our opinion, it is advisable to give a lecture using the newest technologies, especially open-source computer programs that design products, landscape or interior design, etc. The theoretical basics of design and modeling are partly presented at the beginning of the lecture. Stages of design and methodology of organizing the project activity are determined jointly with the students in the form of conclusions formulated in the framework of analysis and discussion of product design.

This type of education includes the following stages:

- preparatory (determining of the product);

- main (message of tasks and requirements);
- projected;
- final (analysis of the developed product, outlining the technologies of its manufacture, formulation of conclusions).

Conclusions. Thus, the formation of project-technological competence of the future teachers of technologies in the process of studying the basics of design and modeling will allow:

- to develop creative projects;
- to determine the logical sequence of project implementation in different directions;
- to own different methods of design and modeling;
- to make effective use of tools and methods for finding new design solutions.

The conducted study also suggests that:

- lectures, laboratory and practical classes on the basics of design and modeling will contribute to the formation of project-technological competence of the future teachers of technologies;
- introduction of creative tasks and projects during the preparation of the future teachers of technologies will allow preparing for the organization of project-technological activity of schoolchildren and realization of tasks of labor training.

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Abstracts

CYNA ANDRIJ, NAHORNA NATALIA. **Specyfika kształtowania kompetencji projektowo-technologicznych przyszłych nauczycieli technologii w nauczaniu projektowania i modelowania.** *Artykuł dotyczy problemów i specyfiki kształtowania kompetencji projektowo-technologicznych przyszłych nauczycieli technologii w nauczaniu podstaw projektowania i modelowania podczas szkolenia zawodowego. W szczególności przedstawiono treść dyscypliny „Podstawy projektowania i modelowania”, która powinna zapewnić dogłębną znajomość istoty procesów projektowania i modelowania, rodzajów projektowania edukacyjnego, etapów cykli każdego projektu, warunków przywództwa, organizacji, wdrażania i oceny wyników działań projektowo-technologicznych studentów, możliwości projektowania edukacyjnego w celu zwiększenia kreatywnego rozwoju osobowości przyszłego nauczyciela technologii. Określono zadania stojące przed dyscypliną «Podstawy projektowania i modelowania» w*

procesie kształtowania kompetencji projektowo-technologicznych, zasady doboru materiałów edukacyjnych. Rozważana jest także istota procesu kształtowania kompetencji projektowo-technologicznych na zajęciach dyscypliny „Podstawy projektowania i modelowania”.

Słowa kluczowe: projektowanie, modelowanie, kompetencje projektowo-technologiczne, nauczyciel technologii.

ЦИНА АНДРІЙ, НАГОРНА НАТАЛІЯ. Особливості формування проектно-технологічної компетентності майбутніх учителів технологій при вивченні основ проектування і моделювання. У статті розглянуто проблеми і особливості формування проектно-технологічної компетентності майбутніх учителів технологій при вивченні основ проектування і моделювання під час професійної підготовки. Зокрема, обґрунтовано зміст дисципліни з основ проектування і моделювання, що має передбачити ґрунтовне ознайомлення студентів із сутністю процесів проектування і моделювання, видами навчального проектування, стадіями циклів будь-якого проекту, умовами керівництва, організації, здійснення та оцінки результатів проектно-технологічної діяльності учнів, можливостями навчального проектування для підвищення креативного розвитку особистості майбутнього вчителя технологій. Визначено завдання, що постають перед дисципліною «Основи проектування і моделювання» у процесі формування проектно-технологічної компетентності, принципи добору навчального матеріалу. Також, розглянуто сутність процесу формування проектно-технологічної компетентності на заняттях з основ проектування і моделювання.

Ключові слова: проектування, моделювання, проектно-технологічна компетентність, учитель технологій.

ЦИНА АНДРЕЙ, НАГОРНАЯ НАТАЛИЯ. Особенности формирования проектно-технологической компетентности будущих учителей технологий при изучении основ проектирования и моделирования. В статье рассмотрены проблемы и особенности формирования проектно-технологической компетентности будущих учителей технологий при изучении основ проектирования и моделирования при профессиональной подготовки. В частности, обосновано содержание дисциплины по основам проектирования и моделирования, которая должна предусматривать основательное ознакомление студентов с сущностью процессов проектирования и моделирования, видами учебного проектирования, стади-

ями циклов любого проекта, условиями руководства, организации, осуществления и оценки результатов проектно-технологической деятельности учащихся, возможностями учебного проектирования для повышения креативного развития личности будущего учителя технологии. Определены задачи, стоящие перед дисциплиной «Основы проектирования и моделирования» в процессе формирования проектно-технологической компетентности, принципы отбора учебного материала. Также, рассмотрены сущность процесса формирования проектно-технологической компетентности на занятиях по основам проектирования и моделирования.

Ключевые слова: проектирование, моделирование, проектно-технологическая компетентность, учитель технологий.

TSYNA ANDRII, NAHORNA NATALIYA. **Features of formation the project-technological competence of the future teachers of technologies in the process of studying the basics of design and modeling.** *The article deals with the problems and features of formation the project-technological competence of the future teachers of technologies in the process of studying the basics of design and modeling during professional training. In particular, the content of the discipline on the basics of design and modeling is substantiated, which should provide a thorough students' acquaintance with the essence of the processes of design and modeling, types of educational design, stages of the cycles of any project, the conditions of leadership, organization, implementation and evaluation of the results of students' design and technological activities, educational design opportunities to enhance the creative development of the future teacher of technologies. The tasks that are faced with the discipline "Basics of design and modeling" in the process of forming project-technological competence and principles of selection of educational material are determined. Also, the essence of the process of forming project-technological competence in the basics of design and modeling is considered.*

Keywords: design, modeling, project-technological competence, teacher of technologies.