IMPROVEMENT OF THE METHODOLOGY FOR THE FUTURE TEACHERS' PROFESSIONAL COMPETENCE DEVELOPMENT

[1]Muslimov Narzulla Alikhanovich, [2]Akhmedova Mukarram Tursunalievna, [3]Muslimov Sherzod Narzullaevich, [4]Rajapova Khurshida Khusanbaevna, [5]Umarova Zukhra Abdurakhmanovna

[1]Director of the sectoral center for retraining and professional development of pedagogical personnel at Tashkent state pedagogical university.

[2]Associate Professor of the "Pedagogy" department of Tashkent state pedagogical university named after Nizami, candidate of pedagogical sciences.

[3]Doctoral student of Tashkent state pedagogical university.

[4]Researcher of Uzbekistan Scientific Research Institute of Pedagogical Sciences named after Kori Niyazi

[5]Chirchik State Pedagogical Institute of Tashkent region, teacher of "Primary education".

I. Introduction

In the 21st century, education in the world is recognized as the main factor in ensuring sustainable development, the International education concept defines an urgent task - "creating opportunities for obtaining education throughout life", which has expanded the possibilities of improving the teachers' professional training level, in particular, future teachers for pedagogical activity, the use of techniques aimed at improving their professional and graphic competence developing system. In the global informatization, the intensive development of alternative (computer) and digital technologies dictates the need for international organizations to pay attention, in particular, to mastering, specialists, including future specialists of ICT competence. So, in UNESCO strategic projects, such as "ICT competence framework for teachers. UNESCO recommendations. Plan 2.0 for 2011 ", "Qualified teachers for all education (2012-2015)" special emphasis is placed on the presence of all conditions in an innovative educational environment for the ability manifestation to freely and effectively work with ICT on the basis of professional competence in a modern specialist guise. The need for the modern digital technologies use of the format in the academic disciplines teaching process increases the relevance and significance of such a quality development of future technology education teachers as effective work with ICT.

A large-scale work is being carried out to reform the lifelong education system in our country, which is confidently moving along the progress path, the introduction of educational technologies and an increase in the education effectiveness, special attention is paid to planning the education content (educational content), structuring professional competencies, creating new methodological training models and their application in practice.

Ensuring the professional activity quality, the professional competence formation of the future teacher, the technologies development for implementing this in the the educational process in the modernization of the professional activity. In the Action Strategy for the further development of the Republic of Uzbekistan, it is defined as a priority task of improving the continuous education system.

In the modernization of the education content, future technological education teachers are required to master professional knowledge, skills and abilities, to apply them in subsequent professional activities on the basis of special personal qualities.

II. Main part

Professional graphic competence is the future specialist's possession of theoretical knowledge, practical skills and abilities in the relevant field of technological education, personal and professional qualities acquired in the learning process and their willingness to fully demonstrate them in their professional activities.

The study identified the qualities that form the basis of the professional-graphic competence of the technology education teacher (see Fig. 1).

Basic qualities	
Professional erudition	Professional responsibility
The ability to think logically	Critical thinking
Visual imagination	Creative skills
Ability for foreign languages	Technical ability
Graphic skills	Ability to design
Ability to design	Information culture
Research potential	Technological ability
Analytic skills	Reflection ability

Fig. 1. Qualities that form the basis of the professional-graphic competence of the future teacher of technology education

The professional graphic competence development of future teachers of technology education at HEI requires a systematic approach to the corresponding process as a specific basis for the specialist's professional training process. A systematic approach is reflected in the correct choice of priority principles and their active implementation in practice. In this regard, we paid attention to identifying the priority principles for the professional graphic competence development of future teachers of technological education in HEI.

Many years of experience in HEI allowed us to study the future teachers' activities of technology education in HEI and conclude that the following principles contribute to their professional competence development: scientific character, continuity and consistency, theory and practice unity, interdisciplinary integration, compliance with social progress, educational content accessibility, visibility, individual approach, technological approach, innovative approach, creative approach, reflective approach, consciousness and activity, knowledge strength.

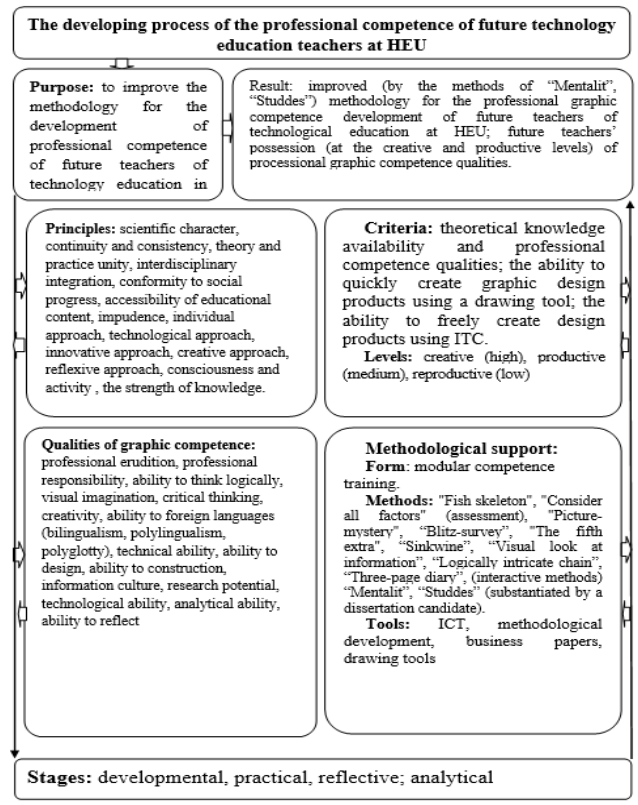

Fig. 2. Model of the development process of professional graphic competence of future technology education teachers in HEI

One of the scientific and pedagogical tasks solved in the study was a model creation for the professional graphic competence development of future technological education teachers in HEI. The development process model of professional graphic competence of future teachers, based on taking into account the scientific and pedagogical activities peculiarities aimed at solving the research problem, has the following content (see Fig. 2).

- In order to improve training future teachers' quality and efficiency of technology education, we have identified as one of the main objectives of our research to draw attention to the consistency and conformity of the State educational standard, curricula and programs. Accordingly, based on the general nature of the chosen research field as a scientific research object, the idea of the aspects that must be taken into account in the students' professional graphic competence development was clarified.

The direction of the bachelor's degree "Technological education" covers a complex of issues, such as academic disciplines, methods, techniques, means of pedagogical activity used in the bachelor teachers' preparation for secondary schools, vocational education institutions; engaging in research work in scientific research institutes of pedagogical sciences of the Republic of Uzbekistan and as an applicant; professional activity in other state and non-state institutions.

In the general professional disciplines teaching process on the basis of a modular-competence-based approach, as a result of all methods use, educational means, the students' professional competence formation is ensured.

The State educational standard of higher education provides a definition: module - interrelated and logical completed academic disciplines and their components to achieve a specific goal and result of training and education.

Modular competence-based education has a special program that includes methodological instructions for students to achieve didactic goals, a target program for the actions presented, a bank of information, and differs from other types of education in the following aspects: complete education content, presented in the form of independent modules; the communication of the teacher with the student is built on a fundamentally new basis. For each meeting with the teacher, the trainee brings the initial (primary) training to a certain level, taking into account the personal ability to increase knowledge.

The modular-competent education program reflects such features as integrity, relative independence and logical completeness of the content; the structure adaptability; efficiency of control and learning outcomes assessment; ensuring the mastery of the professional competence qualities by the future or current specialist, focus on a clearly defined goal in development.

In higher technological education, the educational process based on the modular-competence approach is organized in such a way that the education goal is the totality of the student's professional competencies, and the means of achieving it is the modular construction of the technological education content and structure.

A module is an independent unit of a training program aimed at forming a specific professional competence or a group of competencies. In other words, the module is a completed unit of the curriculum that forms one or more competencies, and ends with the students' knowledge and skills control. Consequently, the modular training program is focused on the certain competencies acquisition, and consists of a set of modules arranged in a certain sequence.

Interactive methods are a set of actions aimed at mutual exchange of opinions, mutual complementing of each other's opinions, as well as non-verbal and verbal interaction. Intellectual actions based on interaction in the use of interactive methods are not limited to the influence or motivation function, but can also serve as directing the cooperation subjects to creative search, theoretical and intellectual judgments that help to discover unknown facts.

In teaching practice, the interactive methods "Fish skeleton", "Visual look at information", "The fifth extra", "Consider all factors" (assessment), "Sinkwine", "Three-page diary", "Picture-mystery", "Logically intricate chain "," Blitz-survey", "Basic groups ", as well as methods justified by the candidate's methods.

We have developed and tested the following methods:

1. Method "Mentalit" (fr. "Mentalité" - "intellect", "mindfulness"). The aim of the method is to develop students' skills in performing graphic and design work by ensuring the simultaneous creation of a drawing (image) directly with a teacher or moderator conducting a "master class".

This method, which has a competitive nature, contributed to the strengthening of students' interest in studying the academic discipline fundamentals, increasing educational and cognitive activity, the ability formation to quickly perceive educational information.

The method can be effectively used both in small groups and in collectives. When applied, it creates an opportunity to form the qualities of graphic competence both in small groups and in a team for each student. Accordingly, the subject teacher should prepare separate assignments for small groups or students. The method can be effectively used both in small groups and in a team.

The main requirement: high-quality performance of the study assignment simultaneously with the teacher or moderator.

Means of the "Mentalit" method application: blackboard or paper of formats A0 (841x1189 mm), A1 (594x841 mm), A2 (420x594 mm), A3 (297x420 mm); Web site https://www.youtube.com.

Within the research framework, the “Mentalit” method was used in conducting master classes (skill lessons) on the following topics: 1. “Rules for drawing up drawings. Госты ЕСКД” // https://www.youtube.com/ watch?v=GaH_cYYhKjI. “Урок №1. 3D чертеж” // https://www.youtube.com/ watch?v=xq1jrTSJDuU.

2. Method "Studdes" (eng. "Studies" - "research"). The purpose of the method is to develop research skills, ability of working in a team of students.

The research activities of small groups are organized in the following stages: Step 1. Each student chooses a topic of interest and joins a small group working on the topic. Stage 2. The group members jointly draw up a plan for the educational tasks implementation on the topic, and tasks are distributed among the group members. Stage 3. Each member of the small group searches within the task framework performed by themselves: collects information, summarizes, analyzes the data, comes to a final conclusion, exchanges opinions with group members, and reviews the conclusion based on their opinions. Step 4. Each member of the small group prepares a report on the research results. Step 5. Based on the reports, a small group presentation is prepared. Stage 6. Each small group activities are evaluated by the academic community.

In the practice of teaching future technology education teachers, in order to develop their professional competence, attention was paid to the rationality (objectivity) in the analytical plan (scientific and research, production and technology, design and engineering, experimental research skills and abilities) of future technology education teachers. For this, the criteria for studying this fact have been determined, they are as follows:

1. Availability of theoretical knowledge and graphic competence qualities.
2. The ability to quickly create design products using a drawing tool.
3. Ability to freely create design products using alternative (computer) programs (technologies).
4. 4. Ability to create design products using digital 3D technologies.

Based on these criteria, the following levels of mastering knowledge, skills and abilities, graphic competence qualities have been determined.

Indicators of assimilation level

Assessment	Evaluation criteria
High (creative)	The student clearly demonstrates the presence of theoretical knowledge and graphic competence qualities; consistently demonstrates the ability to create graphic design products using drawing tools; if necessary, shows the ability to freely create graphic design products using alternative (computer) programs (technologies); sometimes there is an ability to create graphic design products using digital 3D technologies.
Average (productive)	The student demonstrates the presence of theoretical knowledge and graphic competence qualities in accordance with the curriculum requirements; not promptly, but with high quality and in accordance with the established requirements, can create graphic design products using drawing tools; there are difficulties in creating graphic design products using alternative (computer) programs (technologies); does not show activity in the graphic design products creation using digital 3D technologies.
Low (reproductive)	The student tries to fulfill the curriculum requirements in the theoretical knowledge manifestation and graphic competence qualities; tries, but makes a lot of mistakes when creating graphic design products using drawing tools; meets with practical difficulties when, if necessary, the graphic design products creation using alternative (computer) programs (technologies); there are no skills to create graphic design products using digital 3D technologies.

In order to verify the study reliability, an experimental work was carried out. The purpose and content of the pedagogical experiment was aimed at checking the forms, methods and means correctness proposed in the work, as well as assessing their application results' objectivity in practice. In the course of the study, the sequence of actions was reflected, work was carried out to realize the goal, determine the goal, select forms, methods and means, plan, apply, formulate conclusions, and correct. An attempt was made to demonstrate the application consistency of the basic technique and forms according to the general logic of pedagogical actions.

The experimental work results carried out in the experimental and control groups during two academic years, based on testing at the beginning and end of the experiment, are shown in Table 3.

Pedagogical experimental work to test the practical application effectiveness of the experimental program of the discipline "Descriptive geometry and engineering graphics" was carried out by the researcher together with professors-teachers who read this academic discipline, as well as practicing teachers.

A plan and texts were drawn up, which fully set out the educational material content on the topics studied during the preparation for the experimental work and during its implementation.

Table 3.The mastering level by students of the academic disciplines "Descriptive geometry and engineering graphics"

Academic year	Type of education	Number of students		Level (assimilation)	Experimental group (EG)	Control group (KG)
		EG	KG			
	Lectures			Very high (excellent)	11 (42%)	4 (15%)

2018-2019		26	27	High (good)	12 (46%)	8 (30%)
				Average (satisfactory)	3 (12%)	15 (55%)
	Practice lesson	26	27	Very high (excellent)	12 (46%)	5 (18%)
				High (good)	12 (46%)	8 (30%)
				Average (satisfactory)	2 (8%)	14 (52%)
	Individual education	26	27	Very high (excellent)	12 (46%)	5 (18%)
				High (good)	13 (50%)	9 (33%)
				Average (satisfactory)	1 (4%)	13 (49%)
2019-2020	Lectures	26	28	Very high (excellent)	12 (46%)	5 (18%)
				High (good)	12 (46%)	8 (28%)
				Average (satisfactory)	2 (8%)	15 (54%)
	Practice lesson	26	28	Very high (excellent)	13 (50%)	5 (18%)
				High (good)	11 (42%)	9 (32%)
				Average (satisfactory)	2 (8%)	14 (50%)
	individual education	26	28	Very high (excellent)	13 (50%)	5 (18%)
				High (good)	12 (46%)	10 (36%)
				Average (satisfactory)	1 (4%)	13 (46%)

At the end of the experiment, the students' knowledge and skills in the academic discipline "Descriptive geometry and engineering graphics" acquired in the lessons course were assessed based on the criteria developed as a result of the knowledge and skills assessment using electronic educational simulators when performing laboratory work, intermediate control, surveys, credits.

In the experimental work course, the compliance of the students' knowledge level of the group with the State Educational Standard requirements was taken into account. To determine the teaching effectiveness of the specialty subject on the basis of information and pedagogical technologies, the testing results, generalizing classes and students' answers to the final questions were subjected to qualitative and quantitative analysis.

In the experimental work course, a number of methods were used to assess the increase in the educational process efficiency. In the analyzing process of the experiment results, using methods of statistical data processing proposed by a number of scientists were studied and applied to the experiment results.

(ОСНОВНОЙ-MAIN, ОЦЕНКА-ASSESSMENT, ЛЕКЦИЯ-LECTURE, ПРАКТИЧЕСКОЕ-PRACTICAL, САМОСТОЯТЕЛЬНОЕ - INDIVIDUAL)

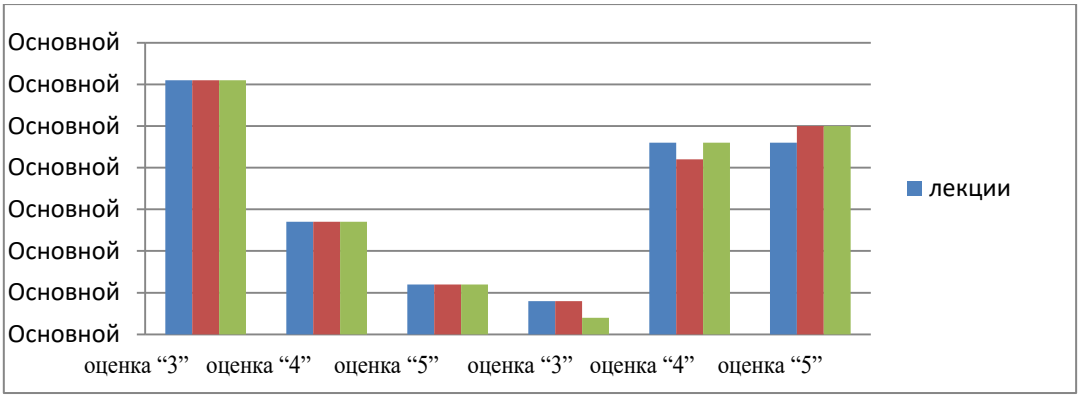

Fig. 3. Performance indicator chart

The experimental work results showed methodical work. Проведенная в экспериментальных группах, привела к достижению более высокой эффективности по сравнению с контрольной группой.

The experimental work results carried out within the study framework testify to the classes effectiveness conducted on the basis of interactive educational technologies and methods, taking into account their interests, while more attention was paid to independent education. The experiment effectiveness carried out in the 2010-2020 academic year at KSPI, JSPI, TSPU is 1.08 times higher.

III. CONCLUSION

1. The scientific literature analysis has shown that the created conditions are insufficient for the full use of the interactive methods and technologies possibilities in the development and professional graphic competence of future teachers of technological education in the learning process, as well as the need for specifying the requirements for professional training of specialists, defining the “professional skill” concept.
2. In our study, interactive technologies and teaching methods mean planning, management, goals realization, analysis and forecasting of the pedagogical process based on new means and methods of receiving, storing, displaying and transmitting information by the education subjects.
3. The effective possibilities of interactive educational technologies and methods were identified. Successfully testing them in the technology teachers’ preparation at HEI allowed us to express our understanding.
4. The effective possibilities of modular educational technology and interactive methods "mentality", "student", "basic groups", serving the professional graphic competence development, criteria for determining the professional skills formation level are substantiated.
5. The factors influencing the process of forming students' professional skills are: social order for the training of a specialist; material, technical and methodological resources of the institution; the educational process organization.
6. The following methodological conditions introduction into the educational process contributes to the students’ professional skills formation: improving the education content, which is reflected in the practical orientation strengthening; organizational and methodological support of training sessions; the use of interactive methods and training forms based on a modular-competence approach at all stages of the students' professional skills formation.
7. The proposed teaching methods reliability for students of technological education in the subject "Descriptive geometry and engineering graphics" is confirmed using the mathematical statistics methods.

8. The proposed types and classes content contributed to a noticeable increase in the students' knowledge level. High quality indicators of knowledge assimilation in the subject "Descriptive geometry and engineering graphics" were demonstrated by the experimental group students.

References

1. V. I. Baydenko. Competences in vocational education (to the development of a competence-based approach) [Text] / V.I. Baidenko // Higher education in Russia, - 2004. - № 11. – p. 3-13.
2. Bondarevskaya E.V. The predictive role of the concept of personality-oriented education in the development of a holistic theory [Text]: Manuscript / E.V. Bondarevskaya. – M., 1999. 102 ChGPU Bulletin 10'2011 94
3.Brazhe T.G. From the experience of developing the general culture of the teacher [Text]/ T.G. Brazhe // Pedagogy. – 1993. - № 2.
4. Vigorskaya, T.Yu. Problems of optimization of geometric-graphic training of students. [Electronic resource] http://totem/edu.ru/index.php?option=com_content&taskview&id=619&Itemid=28/
5. Galperin, P. Ya. Introduction to psychology [Text]: textbook. Manual for universities / P.Ya. Galperin - 3rd ed. - M.: Book House "University", 2000. –p. 425
6. Gershunsky B.S. Philosophy of Education for the 21st Century. - M .: Perfection, 1998. –p. 608
7. Zaprudsky N.I. Scientific and pedagogical support for advanced training of teachers of natural and mathematical subjects [Text]:Dis. In scin. report form of doctor of ped. sci./ N.I. Zaprudsky. – Minsk, 1993. –p. 36
8. Zimnyaya I.A. human competence - a new quality of the result of education [Text]// Education quality problems. Book. 2. Competence of a person - a new quality of the result of education. Materials of the XIII All-Russian meeting. - M .; Ufa: Research Center for the Problems of the Quality of Training of Specialists, 2003. – p. 4-15.
9. Information and communication technologies in education [Text]: teaching aid / I.V. Robert, S.V. Panyukova, A.A. Kuznetsov, A. Yu. Kravtsova. – M.: « Bustard», 2007 – p.250
10. Kabardov M.K. Types of linguistic communication skills and competencies [Text]/ M.K. Kabardov, E.V. Artsishevskaya // Questions of psychology.1996. – N 1. – p. 34-49.
11. Yu.V. Koinova. Formation of professional competence of social workers in the process of higher education (based on the material of Germany) [Text]. Diss. for a work scientific degree of Cand. ped. sciences. M., 1996.
12. Krylova N.B. Formation of the culture of the future specialist [Text] / NB. Krylov. - M .: Higher school, 1990.
13. N. V. Kuzmina Research methods of pedagogical activity [Text] / N.V. Kuzmina. L .: Publishing house of LSU, 1970. – p. 114
14. N. V. Kuzmina Professionalism of the personality of the teacher and master of industrial training [Text] / N.V. Kuzmina; VNII prof.-tech. sci. - M.: high school, 1990. – p.117
15. A.K. Markova Psychology of professionalism [Text]. - MGF "Knowledge". M, 1996. –p. 308
16. Maslow A. New frontiers of human nature [Text] / Tran. from English M .: Meaning, 1999. –p. 425
17. Matyash N.V. Self-education of the professional competence of the future teacher: Abstract of dissertation …. can. ped. sci / N.V. Matyash. - Bryansk,1994. – p.16
18. The first social dictionary [Electronic resource] <ahref="http://webotvet.ru/articles/opredelenie-interfeys.html"> What is interface .
19. A.I. Piskunov. Pedagogical education: concept, content, structure [Text] // Pedagogy.-2001. №3. - p.41-47.
20. A.I. Piskunov. Pedagogical education: purpose, objectives and content [Text] / A.I. Piskunov // Pedagogy.– 1995. № 4. – p. 59-63.

21.Rozov N.S. The values of liberal arts education [Text] / N.S. Rozov // Higher education in Russia. - 1996. - № 1. – p. 85-89.
22. Slastenin V.A. Pedagogical process as a system [Text]// V.A. Slastenin.–M.: Publishing House MAGISTR-PRESS, 2000. – p. 195-219.
23. Shakurov R.Kh. Experience in managing secondary vocational schools [Text]: Method. recommendation / R.Kh.Shakurov. - Kazan: SRI PTO APN USSR, 1982. –p. 36
24. A. D. Schekatunova Educational model "school-school of arts" as a personal developmental system [Text]: Dissertation …. can. ped. sci. /A.D. Schekatunov. - Volgograd, 1995. – p.177