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Development of metasubject competencies in future specialists through information and communication technologies

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Abstract

The article discusses the problem of the development of professional training of future specialists studying in higher educational institutions, based on a competent approach. A model for the development of professional training of future specialists on the basis of a competent approach and the content of its components, the results of the model implementation are described.

Key words: higher education institution, competence, methodology, vocational training, engineering, competence-based approach, machinery and equipment, training exercises, model, component, evaluation criteria.

Introduction

At a time when the development of information and communication technologies in the world and the widespread use of information in the educational process is growing, it is increasingly important to improve the methodology of application of information and communication technologies in the development of meta-subject competencies in future professionals. Of particular importance is the creation of intellectual resources of society through the development of innovative teaching technologies, the design and coordination of the educational process, the development of deep meta-subject competencies to guide students in the information environment.

Research on the creation of a system of creative tasks in the development of meta-subject competencies through information and communication technologies has become a priority for future professionals, special attention was paid to designing educational content, structuring meta-subject competencies, creating new methodological models of teaching and their application in practice. The use of information and communication technologies in the educational process on the basis of a new approach has allowed future professionals to effectively organize the learning process related to meta-subject competencies and raise education to a new level of quality. The Action Strategy for the Further Development of the Republic of Uzbekistan identifies the improvement of the system of continuing education as an important task [1].

The process of informatization of education depends on the level of competence of the future specialist in the use of information and communication technologies. Therefore, a number of scientific studies have been conducted on the problems of informatization of vocational education, preparation of future professionals for the use of information and communication technologies, the potential of information and communication technologies in the development of future professionals and the formation of social intelligence in future mechanical engineers.

Research Methodology

In the development of metasubject competencies, in addition to the specific character and characteristics of the individual, a number of individual abilities are also important: mental abilities (strategic thinking, mobility and breadth of vision, foresight); organizational skills (ability to make

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the right decisions in a specific situation, to work in a team, to direct people to a goal for decision-making); communicative skills (ability to act quickly in interactions with people, perceptual skills and abilities, ability to prevent conflicts and come to terms (compromise), creative abilities, etc. That is why the process of training a specialist should be aimed not only at imparting professional knowledge, skills and abilities, but also at developing his personality.

The development of metasubject competencies by us is as follows: elementary-operational; reproductive; creative levels are offered.

Criteria and indicators need to be identified to diagnose the level of development of meta-subject competence in the learning process. Therefore, it is expedient to distinguish criteria based on the structure of meta-subject competence and activity, which allows to assess the level of development of meta-subject competencies at a certain stage of vocational education.

According to B.C. Tsetlin, "criterion" means a relative, quantitative feature that represents the qualitative state of the subject, defined on a scale, and "indicator" means an absolute quantitative characteristic. This idea is indeed true. If the "level" is considered as a scale, a level of quality, the ability of the subject (for example, to perform a particular task), then the "level" should be defined as objective factors: criteria and indicators [2].

According to I. Salomatov, meta-subject competencies are developed on the basis of mastering the methods and techniques of general educational activity and consciously integrative use of knowledge from various disciplines (special, methodical, psychological-methodical, socio-political, etc.) at all stages of practical activity [3].

Meta-subject competencies are the ability of a future specialist to plan and carry out educational activities in conditions that are new to him on the basis of previously acquired professional and specialized knowledge and skills.

Practice shows that with the use of information and communication technologies, the organization and management of the educational process rises to a qualitatively new level. The use of new information and communication technologies in education to some extent optimizes the educational process. Serves to create its information and methodological support.

In the development of meta-subject competencies in future specialists on the basis of the use of information and communication technologies, it is expedient to take as a basis the concept of D.Hen. He identified five criteria for the use of information and communication technologies in the educational process.

In accordance with the considered components, the level of preparation of future specialists for the use of information and communication technologies in educational activities was diagnostically studied..

Based on the analysis of pedagogical literature and the requirements for the use of information and communication technologies in the practical activities of the future specialist, the study identified the following criteria: motivation and level of knowledge on the use of information and communication technologies in practice; the level of development of skills of the future specialist in the use of information and communication technologies in practice; the degree of development (creative mastery) of the creative position in the future specialist.

A model for the development of meta-subject competencies in future specialists through information and communication technologies has been developed (Figure 1). The structure of the initial learning situation proposed by AP Astaduryan and EG Malinochka [4] was used as a basis for the development of a model for the development of meta-subject competencies in future professionals through information and communication technologies. This structure was adapted to

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the experimental conditions of the study. In creating the conditions for the development of meta-subject competencies in future professionals through information and communication technologies, the participants of this pedagogical process,

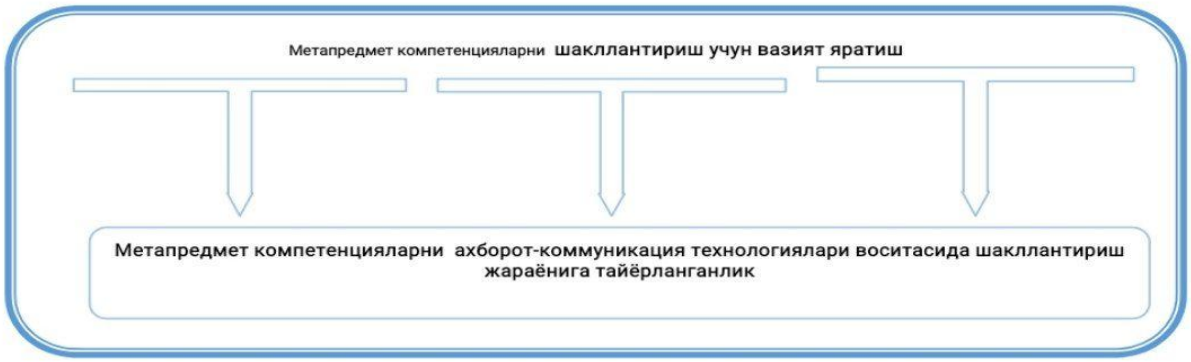

Figure 1. Model of development of meta-subject competencies in future specialists through information and communication technologies

That is, there were specific features of the activities of future professionals, the content of its components, the involvement of the computer as an object of activity of the future specialist.

A necessary condition for the pedagogical support of future professionals in the development of meta-subject competencies through information and communication technologies is the readiness of the teacher for this process. The prospective specialist should have a meta-subject competency development program based on the study of the subject using computer technology. He can create such a program only if he has the following qualities:

- high pedagogical education of the future specialist, high professional skills;

- knowledge of important professional qualities, meta-subject competencies, professional abilities of the future specialist and their development and development in the educational process [9].

Interactions take place in the learning process. In the model, this corresponds to the block "Development of meta-subject competencies through information and communication technologies." Development of professional knowledge and skills in the educational process through the use of information and communication technologies is carried out in the teaching of pedagogical disciplines [11,12,].

The educational institution accepts prospective specialists with different levels of professional knowledge and skills. Therefore, in the educational process it is necessary to take into account the level of development of professional knowledge and skills in the future specialist. The prospective professional can further develop his / her professional knowledge and skills according to the level of knowledge and skills he / she has developed. It is possible to distinguish low, medium, high levels of development of meta-subject competencies in future specialists [5,6].

The technology of training future mechanical engineers for the use of information and communication technologies includes the task of developing in future professionals the skills of research work, creative independence and the study and generalization of advanced pedagogical experience.

Effective technologies based on the integration of pedagogical and information and communication technologies were used in the practice to ensure the quality of training of future

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specialists. The basis of such technologies was e-learning tools.

On the basis of an electronic educational-methodical complex, a model of improving the professional training of future specialists in the subject ("Basic methods of welding"), ie the development of meta-subject competencies, has been developed. It consists of a logically ordered system of interaction between the learner, the training program (electronic educational-methodical complex) and the future specialist. The model envisages the development of methodological meta-subject competencies in future specialists, along with knowledge of the subject, the relevant topics and sections of the subject "Basic methods of welding" using modern information and communication technologies to solve problem, situational tasks, cases independently. The model also reflects the organizational and methodological conditions for the effective implementation of the acquisition of scientific knowledge and the development of meta-subject competencies in future professionals on the basis of an electronic educational and methodological complex.

Training of future specialists in the process of internship using information and communication technologies, e-learning tools, a system of consistent "training" will give the expected results. The purpose of the special course "Training of future specialists in the use of information and communication technologies in industrial enterprises during the internship" was developed; the main directions of the problems of improving the professional and pedagogical training of future specialists through information and communication technologies have been identified; a thematic plan was developed; the objectives of the course were defined.

The development of meta-subject competencies in future specialists through information and communication technologies was carried out at the elementary-operational, reproductive, creative levels.

All stages of developmental testing have their own organizational forms (lectures, seminars, laboratory classes, a special course "Training of future professionals in the use of information and communication technologies in the process of internships", pedagogical practice, independent study), specific topics of the working program. was carried out in the study. The content of education was built in such a way that after each stage of the experiment there was an increase in the development of professional knowledge and skills in future professionals.

The elementary-operational stage of experimental training was carried out in experimental groups in the process of lectures, seminars, practical training, practice and independent learning on "Basic methods of welding". The content of lectures and seminars, practical trainings, internships was organized in such a way as to direct future professionals to solve the problem through the use of information and communication technologies. In addition, future professionals have the opportunity to discuss the importance of the use of pedagogical and information and communication technologies in education, to organize games, to discuss lesson plans using information and communication technologies, to analyze the pedagogical situation, to work independently.

Comparing data on the development of meta-subject competencies in prospective professionals, it was found that the results obtained through recording and developmental experiments were significantly higher in the experimental group on each of the proposed criteria. An increase was also observed in the control groups, however, it was significantly lower than the results of the experimental group.

The results of experimental work conducted during the study showed that the training of future professionals on the basis of e-learning simulators, information and communication technologies and pedagogical technologies used in the development of meta-subject competencies

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is effective. Analysis of the progress of the recording and developmental stages of the experimental work and the empirical data obtained confirmed the validity of the research hypothesis.

Conclusion

1. Target parameters, content and organizational and methodological specifics of preparation of the future specialist for universal educational activity are considered. It should be noted that the most important condition for developing the content of vocational training is a clear understanding of the content of meta-subject competencies necessary and sufficient for successful implementation of practical activities, as well as the purpose of vocational education.

2. The concept and structure of "meta-subject competence" was analyzed and it was found that it is a synthesis of various elements of activity, related to the cognitive, general and special activities necessary for good performance of educational activities. The concepts of “meta-subject competence”, “professionally important qualities” were interpreted in terms of informatization of education.

3. The development of metasubject competencies has elementary-operational, reproductive, creative levels. The following are the criteria for determining the level of development of meta-subject competencies: the quality of creative tasks performed on a particular sample; correct execution of production technology; compliance with labor productivity norms; independence

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