

Lyenuza TARKHAN

Crimean Engineering and Pedagogical University, Ukraine

Pedagogical conditions of formation of technological competence in vocational training

The level of training of future specialists depends to a large extent on professional and pedagogical competence of a teacher of vocational education to which the technological competence is considered to be referred to. The high-level modern technology demands specialists of the advanced professional level, their involvement in technological process, intellectual development, critical and analytical thinking and ability to make the right decisions. All above mentioned qualities which characterize professional competence must be formed during the university education and continually developed in their further work experience.

The foreign scientists as well as researchers of our country who raise some of the technological competence aspects, pay great attention to the issues of formation of technological competence, but unfortunately, on the whole the formation of technological competence has been studied very little. Regardless to solution of the issues of the formation and development of design and technological knowledge and skills in accordance with the individual approaches by A.A. Verbitskiy, D.V. Sannikov, I.A. Radchenko, G.A. Shel'nikova, V.E. Shtainberg, the issues of the formation of technological competence in vocational education of future teachers are not exposed.

There is much in common in the formation of technological competence in vocational education (according to the branches), but still the training in each particular specialization has its own specific characters, that's why the formation of such competence cannot be identical. In this connection it is reasonable to distinguish two aspects of this process, they are the following: pedagogical – universal (common) for all specializations, and branch-wise, which is expected to be formed according to the profile training.

The term «technological competence» is possible to interpret in two ways: both from pedagogical and engineering sciences' point of view, because the construct «technology» is widely used in these sciences. And as the activity or occupation of a teacher of the vocational education is considered to have the biprofessional orientation as well, we believe that the notion «technological competence» of a teacher of the vocational education must display both pedagogical and professional (branch-wise) directions, presenting the activity of con-

version of material and spiritual values. This activity includes the choice of ways and methods of teaching, development of methodological and educational complex of disciplines (MECD) of branch training, which must contain correctly recounted special information, qualitatively executed engineering drafts and drawings, schemes and layout. Consequently, for the future teachers of vocational training their technological competence must be formed during the university education, which will allow them to form the students' high-level technological competence. We consider the technological competence of a teacher of vocational education as the universal characteristic of personality presenting a complex system, including the integrity of knowledge, skills, experience and personality traits stipulating the appropriate quality of technological activity of a teacher in engineering and pedagogical areas allowing to execute expertly certain professional actions.

Thus, in the technological competence of a teacher of vocational education we include:

- 1) technological knowledge, skills and abilities, development of techniques and methods of connecting products' parts and components, their engineering drafts according to the demands, with requirements of material properties and methods of treatment, and development of design-engineering documents for their production;
- 2) constitutive knowledge, skills and abilities of selecting the appropriate educational literature (texts, pictures, maps, charts etc.), creation of the personal variants of educational information, visual aids, lecture summaries, tests, additional summaries, choosing the methods of teaching, and special facilities of teaching for educational training;
- 3) graphic knowledge, skills and abilities of creating the visual teaching and diagnostic aids on the high aesthetic level, registration of drafts in accordance with the requirements of ESCD, including informative and communicative programmers and technics.

The process of formation of technological competence must be implemented in complex, based on several disciplines, as it is impossible to form its components within the framework of one discipline. We highlight that the technological competence in the great extent is focused on the practical realization of the educational process, its active aspect. And only permanent technological activity of students promotes the forming of their technological competence.

In this connection on disciplines of different cycles the students are needed to be given the tasks, connected with this activity (for instance, to develop a test on the certain topic, additional summary etc.) Similar tasks will thrill the formation of the integrated discipline knowledge and simultaneously the formation of the constructive skills as a component of the technological competence. It will also allow to realize the biprofessional orientation in training future teachers of

the vocational education, notably providing the connection of psychological, pedagogical and vocational (branch-wise) training during discipline learning.

Practice shows that there is necessity in determination of methods and means of forming a component of technological competence – technological knowledge, skills and abilities, because students test significant problems in mastering of disciplines connected with mechanical design, which suppose development of drafts taking into account properties of materials and requirements to the designed goods. For the development of such drafts calculation formulas are used which are necessary to know and understand.

One of the methods of forming technological competence at the lecture employment is the problem method of teaching at which the prepared formulas of draft construction are not given to the students. They develop them under the guidance of a teacher and it promotes the acquisition of thorough knowledge because every calculation formula is grounded, the reasons and connections of its origin are open up. Students not only better memorize the material; they form a logical chain of construction with the help of which they can be able independently to develop a draft without using additional source of information.

However, for the achievement of educational aims the use of visual aids is required. For the realization of a problem method of teaching it is possible to use an electronic summary with the effects of animation, for instance, with successive appearance of the name of structural area, a draft with the selected structural area and then calculation formula because it corresponds to the didactic principles in a most degree: visual proof, availability, scientific and systematic character and strict sequence.

A formation process can not be effective and valuable without regular and objective information about how material is mastered by the students, how they apply their knowledge for the solving of practical tasks. Therefore, the system of diagnostics of knowledge and abilities of students must include different types of control: verbal questioning, writing and test control, including automatised, etc.

Most facilities of teaching working professions foresee the use of drafts, that's why a teacher must possess not only constructive and technological knowledge and abilities but also graphic and model.

In the conditions of modernization and computerization of education the ability to develop drafts in the automated mode is needed.

Therefore, a special role in the forming of technological competence is assigned for the training of future teachers of the vocational training to the automation of drafts, which allows to develop drafts for different facilities of teaching, course papers, diploma projects with the use of computer programmers (AutoCAD, CORL, KOMPAC etc.), here removing the lack of hand labour. To judge about the technological competence is possible only on the level of formed competences, namely: structural, graphic and technological, calculation knowledge abilities and skills and by the certain level of experience of their implementation.

In the system of vocational pedagogical education the forming and development of the competence of the future teachers (formation of which takes place in professional activity) is possible during the realization of the following pedagogical conditions, if:

- the orientation of the process of higher vocational education is realized both on the generalized model of professional competence of a specialist and on the concrete competence;
- every stage of teaching students forms not a separate competence but a system;
- the formed technological competences possess the signs of creativeness;
- the orientation of the educational programmer is carried out on the consuming, motivating and technological providing of effectiveness of person's activity in the process of creative solving of professional tasks;
- the purposeful teaching of students is conducted to use methods of synthesized;
- solving of problems in the designed and real professional activity;
- students develop positive personality orientation on the forming of pedagogical competence.

Under the technological competence of a teacher of vocational education we understand the integrative description of teaching results related to the acquisition of necessary personality qualities of a future teacher. They are expressed in obtaining:

- knowledge, abilities and skills in vocational education;
- the simplest algorithms of technological activity.

And also in ability:

- to apply knowledge, abilities and skills in practice depending on a certain situation and to transfer them from one sphere of activity to another;
- to solve technological problems by means of innovative technologies of teaching;
- to appropriate, develop and apply the algorithms of technological activity in practice;
- to organize technological, cognitive and research activity and analyze its process and results;
- to organize and design training on profile disciplines;
- to organize technological activity of students and to form personality qualities necessary for the society;
- to develop a pedagogical tool and to use it for the increase of efficiency of the educational process and monitoring of its results.

Thus, a technological competence is directed at forming qualities of personality necessary for the realization of pedagogical activity and solving of different technological problems, successful implementation of technological activity with the ability to forecast and analyze it.

Abstract

The prospects of further researches is the search of priority elements of technological competence for future specialists both in the process of teaching and in further activity, and address to the concept of resulting units of competence, providing a basis for the formation of technological competence of more specific use.

Key words: technological competences, professional education.

Pedagogiczne uwarunkowania rozwijania kompetencji technologicznych w kształceniu zawodowym**Streszczenie**

W artykule przedstawiono perspektywy badań w zakresie poszukiwania priorytetów kształcenia kompetencji technologicznych przyszłych inżynierów zarówno w procesie dydaktycznym, jak i w edukacji całościowej.

Słowa kluczowe: kompetencje technologiczne, edukacja zawodowa.