Procedural Scheme Design Activity on Creation of the Methodical System for Teaching Bachelors of Mathematics

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Abstract: In «Concept of modernization of Russian, Kazakhstan and post Soviet Union education for the period up to 2013 inclusive» they define a qualitatively new level of preparation of future specialists of non-mathematical specialization. The most important task is the improvement of the methodical system of teaching mathematics bachelors non-mathematical specialty with the competence-context format of teaching higher professional education.

Key words: Modernization • Competence • Context • Competence-context format • Technological culture • Flow sheet • Bachelor • Instrumental education • Private education • Differentiated education • Goal setting • Classification • Methodical system

INTRODUCTION

Technological culture is a sign of optimally organized learning: its structure and quality codetermine a considerable part of the success of the bachelor. The competence-context format may hardly be an exception to this. In this work the various categories and groups of technologies with setting off their competence contextual options are considered by different parameters and criteria from the positions of competence-context format. One of the technologies is analyzed which productively engaged competence of education of learners - the dialogue representing a special interest for us because at the intersection with the area of the nearest development it creates a point of singularity, a point of initiation of competence in the presented earlier integrative model [1]. They have identified and characterized special technological regularities of the learning process and their specific, competence-contextual learning format.

Finally, we investigate the instrumental, individual and differentiated organization of educational process, ensuring competence-contextual format for students [2]. It is shown that in the conditions of educational process on the competence-contextual basis individualization and differentiation acquire the character of self -individualization and self-differentiation - in the light of the probabilistic closing of the subjective experience of students and objectified competences of educational spaces [3].

Methodology: In the context of our research to build a methodical system for teaching mathematics for professional preparation of future specialist non-mathematical specialization you must review the basic concepts related to methodological system of teaching in general. We adhere to the opinion of researchers V.P. Bespal'ko, N.V. Kuzmina, A.I. Nizhnikov, T.K. Smykowskaya and others that focus on the
component structure of the methodical system consisting of: objectives, contents, methods and means of training, organizational forms of the educational process [3].

In our opinion a scheme for the construction and implementation of pedagogical purposes, disclosed in a series of works performed under the supervision of N.F. Talyzina is the most fully developed, operationalized and proved its fruitfulness of the methodical system of teaching mathematics bachelors. The main advantage of her developed approach is the continuity of the objectives of different levels providing their synthesis into a holistic system and initially a direct link of objectives with learning content, which is achieved through a synthetic description of the purposes and contents of education, developed by a bachelor. As N. F. Talyzina noted the aims of education implement a system-forming function in the pedagogical activity. The choice of content, methods and means of teaching mathematics depend exactly on the choice of goals to the greatest extent.

E. C. Zair-Bek describes goal setting as follows: «the information about the problem, condition, situation, its analysis; formulation of the problem and ideas of its solution; a list of desired goals (clearing purposes); general project objectives as the value of education; the project objectives as specifically measurable results; design goals as achievements in creation of conditions for development of educational processes»[4. p.64].

Researchers consider three levels of education: 1) the level of general theoretical build - theoretical concept of the contents of education; 2) the level of teaching the subject - when an idea about what to teach acquires particular type based on the location and functions of the subject in education; 3) level of educational material - the real contents of the elements of the structure content. V.V. Krajewski adds to this list more two levels - implementation of contents: 4) level of education process; 5) the level of the personality structure of the bachelor [5, p. 24].

Teaching methods is the following component of the methodical system for teaching mathematics. Teaching methods are ordered methods related activities of the teacher and the bachelor aimed at achieving the objectives of education and discussed as ways of organization of educational material and the interaction of a teacher and a learner and aimed at solution of educational tasks.

Unequivocal approach to the interpretation of the essence of the method of teaching does not exist. So N. N. Orlov sees the lack of general didactic approach to the interpretation of the training methods and their classification due to the absence of communication with the substance, with the methods of the relevant science. On the other hand, many scientists tend to disagree with the statement that there are linkages of general didactic teaching methods and methods of training in methods.

Means of education are the next component of the methodical system for teaching mathematics. Means is the whole process of the production, which is used for the transition from the target to the real result. The concept of the learning tools used in didactics for designation of one of the components of the activity of the teacher and the learner along with other components (the subject of conversion, products, technology of activities etc.).

A common understanding of the term «pedagogical tool» is absent; there is no unified classification of means of education. Some authors use it in a broad sense to indicate to them the whole project of training and the actual training tools [6]; others refer to the actual tools - tools that serve to achieve the educational and training purposes [7]; the third ones refer to the means of training, in addition to material intelligent tools for the implementation of the mental activity, which give the opportunity to conduct indirect and generalized knowledge of objective reality [8].

As a means of teaching the researchers called a variety of pedagogical tools: educational and professional situation, educational and pedagogical task didactic game, educational project, technical means and others.

Educational and professional situation is a situation in which they permit some contradiction that is considered from two positions object, which aims at the transformation of the situation and the subject, which in this situation, implements actions transformative in nature. Educational and professional situation characterizes certain mental state of a subject, arising during the execution of such a task that requires the opening of new knowledge about the subject, method or conditions for implementation of the action; there is the need for a new attitude, a property or method of action; it is unusual because for successful action it takes love to contradictions, sensitivity to the new thing [9].

Educational and pedagogical problems are problem situations representing the contradictions between the purpose and the conditions of pedagogical phenomenon and resolved educational and informative tools.

A didactic game is creative transforming of experienced impressions, combining them and building up a new activity, corresponding to the demands and experiences of the learner.
A game as means of decision the educational and professional tasks is studied in detail. A game in its content connected with the educational process, enables the trainees to focus on educational and professional task, the solution of which in the course of the game involves less nervous costs and minimal strong-willed efforts that allows you to release the creative potential of the learners. In game situations sometimes they put hard, back-breaking tasks that in other settings discourage students from its decision but the nature of the game is that if there is no absolute voluntariness it stops being a game.

Educational project is organized in a certain way purposeful professional activity, which is an extension of the scheme proposed: «sharing of local solutions of the general problem; carrying out joint studies; study of general and special; preparation of joint publications; participate in playing simulation models; performance of unique joint projects» [10, p. 57]. Technical means of education are an obligatory element of equipping the classrooms and their information-subject environment, as well as the major component of educational material and technical base of educational institutions. With the increase and complication of knowledge and development of science and technology we notice the improvement the educational and technical base of educational institutions, contributing to a better perception of the educational information, its intellectual processing and storage in memory and application in practice. For the appointment of the technical means of education are grouped for the transmission of educational information, training, knowledge control, self-learning etc.

We have developed a three-level model of the methodical system for the measurement of key competences of a specialist when he studies in the competence - context format:

- Modification and technologization of technology by M.Minakhov for a bachelor of non-mathematical specialty in terms of the competence - context format of learning.
- Fixing the dynamics of formation of key competencies in terms of the competence - context format of learning.

The results of the research have contributed to the development of fundamental questions of pedagogy: theory and methods of teaching mathematics of the specialists of non-mathematical speciality, the theory of designing of pedagogical objects, the theory on the integration in the teaching practice of the innovative three-level model, the theory of modification of technology by Monakhov V.M., theory of fixation of dosing dynamics of results. The theoretical model of the methodical system of teaching mathematics the specialists of non-mathematical speciality in terms of competence-context format of training contributes to the modernization of the system of teaching mathematics to students of different specialties.

Methodical system of teaching mathematics the bachelors of non-mathematical specialty of the competence- context format of training showed its fundamental suitability and further it can be used in the educational process. The structural distribution of educational material in higher mathematics for bachelor of non-mathematical speciality designed by us, the content of the course in higher mathematics in the language of micro goals, diagnostics, technology of designing of educational process in mathematics with the use of the orgform in terms of competence-context format of studying [9].

In conclusion we draw attention to the connection diagnosed component of the methodical system of teaching mathematics as a competence-based, context format of a factor with other didactic concepts and psychological and pedagogical realities of the educational process. Such treatment of the phenomena and facts with indirectly expressed diagnosing the potential needs for more free and clear orientation of the teacher not only in the basic zone of diagnostics, but also in the periphery, i.e. in order to more systematic view on the problem of the designing of a diagnosed component of the methodical system for teaching mathematics under the competence-context format of studying [11].

We can see easily the designing of a diagnosed component of the methodical system of teaching mathematics in the conditions of a competence-context format of studying and mechanism in the structure of the main driving forces of learning as well as competence-context format of an integral component of the educational process. The major driving force of teaching, based on contradictions competency-based realities of a bachelor and competency-based realities of the subject of the development of educational content, between which a teacher is – this is a way of consistently, step-by-step (probably, «explosive») movement to make a deep sense of the problem, that in itself is a diagnosis [12].
There is more tangible connection of designing of a diagnosed component of the methodical system of teaching mathematics in perspective interesting for us with multicultural educational space. Multicultural space of sufficient competence density and diversity is a possibility and reality of mediated, indirect diagnosis of the bachelor by the teacher, through their competent contact with the basic values of culture, forming multicultural space [13].

CONCLUSIONS

Serial analysis of the representation of competency-based components in training design is a diagnosed component of the methodical system of teaching mathematics and analysis of examples of competency-based manifestations of the bachelor in the diagnosis, where the teacher allows evaluating diagnostics training as an updates field and gives impetus to the competence development of the bachelor.

REFERENCES