



METHODS FOR THE FORMATION OF COMPETENCIES IN THE TECHNOLOGY OF TEACHING STUDENTS BASIC DIDACTIC UNITS AMONG MATHEMATICS TEACHERS

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Article history:	Abstract:
<p>Received: 14th May 2021 Accepted: 26th May 2021 Published: 26th June 2021</p>	<p>The design of modular training is based on the foundations of the theory of pedagogy and is actually used in pedagogical practice. The essence of this technology is to correctly and functionally divide the content of the original discipline into laconic and complete blocks in accordance with professional tasks and necessary modern requirements. The essence of the modular approach to academic disciplines is that the study of a given subject or discipline occurs more or less independently in accordance with the curriculum, which contains a target block of directed actions to master the selected material, a bank of necessary information (theoretical essence) and guidelines for achieving the necessary didactic goals. In this case, the functions of a teacher-tutor (curator) vary from consultative and informational to coordinating the learning process. The main term of this theory is the concept of a module. Despite the sufficient time of existence of the modular theory, there is still no strictly concept of "module". To this question, there are how many different variants of this concept, depending on the side of the approach to this problem. This concept is directly dependent on such areas of this issue as the process of structuring the content of training, forms and methods of training. V. Goldschmidt and M. Goldschmidt take as the basis of this term the creation of an autonomous, planned unit of the learning process aimed at achieving clearly defined goals. J. Russell considers this concept as an independent part of the academic discipline. In the works of Yu. K. Bashlov and V. A. Ryzhov, the module is considered as a certain amount of information required to perform a certain professional activity.</p>
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A module, as a separately taken part of a certain academic discipline or an element of the educational process, can itself be divided into smaller modular units, which is a definite, complete part. Modular units can form the structure of a module depending on the specific area of the process or discipline under consideration, the peculiarities of training, the rules and possibilities of using these technologies. The module is an independent, logically complete link in the learning process. If we collect information on this issue together, then a module is understood as a unit of the training structure, which is selected and presented in such a way that it is possible to achieve a certain level of preparedness, determined by the target program of actions.

Using a competence-based approach and taking into account the labor costs of training, the use of modules is a fundamental direction in the process of improving educational programs and achieving the availability of teaching methods in various universities. The competence-based approach has steadily entered the educational scheme, but the modular approach is still given quite a bit of time and money for its implementation and development.

If we consider the interconnection of components in the traditional education system, then the basis there is the interconnection of the curriculum, determined by the State Standard, and the discipline studied directly by the student. In education based on a modular system, the module itself becomes a key unit affecting and regulating the curriculum and the learning process, the activities of teachers, as well as the knowledge control system, including the stage of obtaining qualifications.

The modular-competence structure in higher vocational education is an educational concept of organizing the educational process, where the goal of training is a number of student's professional competencies, and the means of achieving is a modular presentation of the content and structure of training.

This reconstruction of the education system implies a change in a number of interrelated components: a change in the proportion of independent and classroom work of students towards an increase in self-education; increasing the structural universality of educational programs; opportunities for obtaining professional skills in related areas of professional activity, improving the system of obtaining profiling of students with the possibility of obtaining the next possible qualification.

The module is the basis of this training program and is a fairly independent unit of the educational program. It is aimed at forming a group of professional competencies. "A module is a complete unit of an educational program that forms one or more specific professional competencies, which has control over the knowledge and skills of trainees at the exit. A modular educational program is a set and sequence of modules aimed at mastering certain competencies required for qualification assignment. " Studying educational modules, the student must master the relationship of all options for the educational parts of this module and the direction of study in general: lecture-practical load, independent work, course work, preparation for intersessional control options, work on independent scientific projects, final qualification work, etc. At the same time, the purpose of studying this educational program is the development by a student of a certain number of professional competencies, and the means of their formation can be a module, which is an independent unit of the education system.

Modular education is a fairly new and progressive direction in educational activities. This type of education contains a number of advantages over the traditional education system. On the part of students receiving education, this is a modern specialized education with minimal financial and time costs, in a convenient form and at its own temporal pace. From the standpoint of the teaching staff - a convenient, more flexible and adjustable form of the educational and methodological course; freeing up most of the time for consulting and tutoring. On the part of the educational institution - training of more specialists with the same volume of teaching staff and on the same training base. From the standpoint of professional branches of activity, there is a real opportunity to deepen the professional training of future personnel with a large profile coverage and without additional financial costs. On the part of social activities, there is a real possibility of obtaining higher education and continuing education of higher qualifications in the postgraduate mode in the system of lifelong learning.

At the same time, the midpoint control system, if desired, can remain the same. Milestone and current certification can be carried out within the point-rating system. After conducting the current certification, it is possible to issue a test or an exam, as a variant of a differentiated assessment, which characterizes the quality of the student's perception of the discipline being studied. At the same time, the necessary average passing criterion is established, according to which the possibility of transferring students to the next course is assessed. Summary information on student certification is in the dean's office. A student who has not received the passing criterion has the opportunity to repeat the training of the corresponding courses for a fee. As one of the options, having consistency with the governing bodies of the university (the dean's office and the dean of the faculty), the student can be reinstated by the course below, where, in accordance with the individual plan, he can add the appropriate passing criterion.

In the past few years, the concept of "module" has been intensively studied from the point of view of the internal content of the concept itself, its structural characteristics, informative content, etc. "Module" as a meaningful concept is used in various fields of knowledge, including pedagogical theory as a definition "Modular methodology" in the system of education and quality management of education.

If we analyze the information in Russian and foreign scientific and pedagogical literature, then modularity in education dates back to the 70s of the XX century.

For example, J. Russell, who was one of the first to introduce this concept, considered "a module as an educational package, covering a conceptual unit of educational material and prescribed actions for students." B. and M. Goldschmid gave the concept of the module as "an autonomous, independent unit in a planned series of educational activities designed to help the student achieve some clearly defined goals." G. Owens introduced the concept of "a module as a learning closed complex, which includes a teacher, trainees, educational material and tools that help the student and teacher to implement an individualized approach, to ensure their interaction."

If we consider the "module" from the perspective of professional training, then we can give it the following definition: a module is an interdisciplinary structural and didactic unit of an academic discipline, providing for the allocation of basic concepts and meanings in accordance with the considered area of knowledge and ordering information from the logical direction of self-learning of the future engineer ... In this case, a module can consist of components, the so-called micromodules or submodules, which are sufficiently independent and distinguished on the basis of the methodology for the formation of the discipline as a whole. If we consider academic disciplines in an interdisciplinary approach, then they, as well as individual sections and topics, become steps in a certain structure of professional training. In essence, such a stage becomes a system of interdisciplinary modules that have their own individuality in terms of knowledge and skills in the specialty and can be combined by a number of criteria that characterize the level of an organized training result in accordance with a multilevel professional hierarchy. You can imagine the gradation of the following hierarchical ladder:

- modules of general scientific training, which can be combined according to a significant feature of the priority development of generalized introspection. These are modules that relate to general vocational training;

- modules, where the final result is the formation and development of engineering skills and competencies. These are algorithmic-level modules;
- modules aimed at mastering special disciplines.

These are modules of the level of creative and intellectual development. This hierarchical list of steps in the modular system includes the following types of modules:

- installation (contain new thematic information);
- informational (standard materials from classical sources);
- operational (practical tasks and tests).

Once again summing up all of the above, we can re-define the concept of "module". A module should be understood as a kind of complete independent unit of knowledge aimed at a specific goal, at the structural and methodological guidance of the development of this module and control over its study. Analyzing the concepts of "module" discussed above, proceeding from the peculiarities of the essence of learning in educational institutions, several elements can be distinguished in the definition of the module:

- the module, being a part of the academic discipline, consists of one semantic unit;
- a module as an educational and informational unit containing naturally formed, final parts of educational material within one discipline;
- a module as a systematic form of an interdisciplinary structure of educational material, consisting of topics of various academic disciplines necessary for one specialty;
- a module as a complex of academic disciplines necessary for mastering a specialty or specialization for assigning a qualification characteristic;
- a module as a system of vocational training directions for a specific profession.

Considering more specifically the concept of "module", we can highlight the specific characteristic features of this concept:

- focus on the goal;
- integration of specific types (types) of training;
- educational and methodological guidance;
- selfeducation;
- the possibility of learning and self-development at an individual pace of work with educational material; control and self-control of knowledge;
- the individuality of the chosen direction of study, etc.

The following conclusions can be drawn from the above analysis. In Russia and abroad, a rather more specialized concept of "training module" is used, and not just a "module". The use of modules is very effective when used in an established modular education system. The concept of a "learning module" is already used in various educational systems (both in higher professional education and in secondary education and in schooling). In domestic education, the concept of "module" is used in higher vocational education with a technical focus. In the scientific work "From traditional through modular to distance education", N. V. Borisova believes that the training module is "an autonomous organizational and methodological structure of an academic discipline, which includes didactic goals, a logically completed unit of educational material, compiled taking into account intradisciplinary and interdisciplinary communications, methodological guidance (including didactic materials) and control system.

Modern researchers-educators believe that the modular technology of teaching reorganizes the educational process so that the student can study independently according to an individually targeted program. In this case, the main key point is the training module, which should contain a block of necessary information on the discipline being studied, the student's program of actions for the best mastering of this material, recommendations and related teaching material.

The technology of using the modules gives an individual approach to learning: by content, by the rate of perception of the material, by the approach to self-learning and self-development, by the implementation of the learning process, by types of control, if possible self-control, etc. support in self-development and self-discipline of students, their skills to work in an individual mode of mastering the selected material.

Modular training as a whole realizes all the concepts of the educational module and rebuilds the educational process in such a way that it allows one or several modules to reveal the content of the educational topic or discipline as a whole. This is possible due to the flexibility of the structure of such an education system, which includes adjusting the structure at any stage of the educational process.

The process of forming flexible vocational education based on the concepts of a modular approach is caused by rapid changes in industry and production, which accordingly affects the change in the list of demanded professions.

One of the approaches in modular training provides the implementation of a modular educational program, consisting of a block curriculum and a number of modular curricula of academic subjects.

The modular curriculum contains a model of the structure of education. It should consist of educational blocks of any necessary content (natural, humanitarian, technical, professional) created for all levels of professional education. Blocks can be grouped into professionally compulsory, optional and optional disciplines. Modular vocational training programs are based on modules that represent meaningful actions at the level of the corresponding educational stage. For each modular program of the academic discipline, a block of training modules is created. A training module can be called a complex of training content for a selected modular unit, which also includes a system for managing

student's educational actions, as well as managing the quality of knowledge in the subject area and methodological recommendations.

Analyzing modular training, we can conclude that this educational process, its structural characteristics are transmitted (compiled) only for professional training and are not focused on the personal development of a specialist and the formation of social competencies, and does not participate in the design of the educational process.

The nature and result of modular education, its changes in comparison with traditional forms, lies in the content, orientation and goals - all this is more focused on self-development and self-education of the student, his initiative, competence, mobility, as well as improving the quality of professional training of specialists and their competitiveness. These changes are reflected in the regulatory documents - the Federal Program for the Development of Education, "The Concept of Modernization of Russian Education". They indicate that "a developing society needs modernly educated, moral, enterprising people who can independently make responsible decisions in a situation of choice, predicting their possible consequences, are capable of cooperation, are distinguished by mobility, dynamism, constructiveness, have a developed sense of responsibility for the fate of the country. ". It was also emphasized here that it is necessary to form "an integral system of universal knowledge, skills, and experience of independent activity and personal responsibility of students, that is, key competencies that determine the modern quality of educational content."

This current situation presupposes the actual development of not only the problems of education, but also the problems of education, with the need to revise the concept of "education" in a modular version, the introduction of the term "module" education ", its main criteria, indicators and characteristics, as well as the harmonious implementation of this concept into pedagogical theory within the competence-based approach.

The introduction of such a term as "module" education "" leads to the need to analyze the concepts of "model" and "modeling".

In pedagogy, a "model" is understood as a system of certain specific structures that reproduces the basic properties of the original system, and "modeling" is an attempt to imitate a real pedagogical system by creating special analogs-imitations that reproduce the principles of the functional organization of this system. "

Taking into account the concepts of "model" and "module" considered above, it is possible to define the model of the "education" module as a certain reference model of the structure of the education process that ensures the quality and quality management of education in the higher education system. This makes it possible to present it as an installation module included in the system of quality assurance and quality management of education in higher educational institutions, consisting of several micromodules that are interconnected in the general model of the "education" module.

Leading social competencies can be included as the basis of the micromodule model of the "education" module:

- the traditional macromodule, showing the plan of educational work of the university and the quality assurance system for training a specialist, well researched and developed quite fully;
- micromodules for the formation of social competences: the competence of citizenship, the competence of health saving, the competence of communication, the competence of social interaction, information technology competence.

The solution to the problem of education must be solved through the following positions:

- what kind of education is carried out at the university;
- how education is implemented in the university system within the framework of the State Educational Standard of Higher Professional Education through the content of education;
- what is the ratio of the classroom and extracurricular components of education.

At the same time, it is necessary to take into account the peculiarities of education itself, the content of the module and its distinctive features from other similar modules and systems.

Education in the system of higher educational institutions must be carried out through the concept of relationship, forming competencies as the implementation of relationships. It is necessary to implement such elements of competencies as knowledge, readiness to actualize the set goals, experience in using knowledge, attitude to the procedure for forming the essence of competencies. At the same time, it is necessary to show what skills and how they are formed, how the readiness for the process of perception is regulated.

It is necessary to form upbringing through the formation of social and ethical competencies that allow the student to have knowledge about culture, be tolerant, morally mature, purposeful in general cultural values. At the same time, it is necessary to evaluate and take into account the control over the perception of the criteria for the quality of upbringing of students, and use it in all types of general education work (classroom and extracurricular, optional, practical).

The module "education" includes the following components: purpose and content, methods, forms, principles, a number of social competences, control over the quality of education, a self-study program. The specifics of modeling this module are as follows:

- the process of education should flow smoothly from school to higher levels of education;
- the process of education in higher educational institutions should take place at all stages of student learning and be a natural process of self-education and self-education; - the process of education at the level of forms and methods differs from the process of education;

- the criteria for assessing the degree of education should be more complex and structured than the assessment of knowledge and skills;
- the opportunity to implement the education program in its entirety is more laborious than the training program.

It is recommended to include the components of the "education" module in the SES HPE in the section "Qualification of a specialist" and the section "Requirements for a specialist".

If the issues of upbringing are reflected in the training of specialists, only then it will be possible to say that the system for ensuring the quality of higher education at the university exists at the proper level:

- the module "education" is included in the curriculum and is in accordance with the humanitarian and socio-economic disciplines. It forms social competences through the content of academic disciplines or through micromodules that form the competencies of citizenship, communication, social interaction;
- this module can be recommended as optional and included in special courses and elective courses;
- the module "education" is included in refresher courses for the scientific and pedagogical staff of the university in order to improve the quality of higher education.

The process of modeling the macromodule "education" should contain the following components: goals and objectives (as the basis of content), forms of implementation, requirements and criteria for the level of development, provision of methodological material.

A micromodule includes the goals and objectives of the entire module, but taking into account the part that is contained in it. It should be designed for an optimal, but small number of training hours for ease of use. Also, it is necessary to have didactic material and literature for teaching, a plan of educational topics, tasks for independent work (situational tests, tasks, exercises) and, as an assessment of the assimilation of the material, the final test.

From the above, we draw the following conclusions.

The modular education system is a fairly modern approach to education in general.

At the same time, the main advantages of this system are its flexibility, creativity, logical completeness, compactness, and interchangeability. At the same time, the modular approach can be applied at each stage of the educational process and can be used both as the main teaching method and with classical traditional teaching methods.

There are many types of modular training.

In practice, the modular approach to learning more accurately illuminates the area of knowledge it is considering, which needs to be conveyed to the learners. At the same time, the equipment with didactic and methodological types of material in this type of training is much higher. Also, in modular training, the structuredness of the process is more developed: goals and objectives are highlighted, the direction of the module-block is from the minimum (small separate topic) to the maximum (macromodule, discipline block), the need to have a plan for mastering the selected material (for training, self-development) , final control over the quality of mastering the material.

Separate and the most important in the application of this methodology is the development of the module "education". This module can be mastered through the development of relevant competencies, gradually instilling appropriate skills and principles at all stages of training and personality development as a whole.

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