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MODULAR LEARNING AS A TECHNOLOGY OF MULTILEVEL TRAINING OF MEDICAL UNIVERSITIES STUDENTS

Abstract. The department of policlinic pediatrics and propaedeutics of childhood diseases developed the module «Rational feeding of children» which is being tested on students. The methods of application of this module are being discussed as well as its implementation into the educational process.

Keywords: higher school teacher, modular training, feeding of children.

In the Russian medical schools the concept of multilevel continuous medical education is accepted and implemented, it focuses on in-depth fundamental training of future doctors. Some of the problems with higher medical education in Russia include a detailed study of the fundamental disciplines with relatively low motivation of students to the study of core disciplines. At the same time, rapid development of medical science, the development and introduction into clinical practice of new technologies and fast expansion of the range of medicinal preparations determine the steady increase in requirements to the quality of preparation of medical schools graduates so that it can meet the needs of a changing labor market. An important stimulus of modernization of higher medical education, of course, is the increase in the competition between different medical institutions of higher education, which is determined by the signing of the Bologna Declaration by Russian Federation and its integration into the European educational space. All the above determines the need for further improvement of the educational process in the higher medical school in Russia. The use of new learning technologies, one of which is a modular training, in the higher medical schools is of fundamental importance for the improvement of the educational process [1, 2, 3, 4, 5].

Modular training in its original form was born in the late 60s and then spread to the English-speaking countries like the US, UK and Canada. Initially modular training was proposed for individual learning, but then it began to be applied more widely, being treated as a new form of work in the classroom. After the UNESCO World Conference, which was held in 1972 in Tokyo and discussed the problems of adult education, modular training was recommended as the most suitable for those who want to continue their education. Later the value of this technology has been defined not only for adult education, but also for the training of young people and students.

According to modern concepts, the term "modular training" refers to the technology of teaching students, the main means of which are the module and the modular program. During the initial period of implementation of modular technology in the educational systems of the USA and Great Britain the concept of modules included a certain set of training materials. With the further development of the technology the meaning of the term "module" has modified: a module was understood as an independently planned unit of learning activity, then as a relatively independent part of a particular system, carrying the functional load that corresponds to a certain "dose" of information or activity, sufficient for the formation of various professional knowledge and skills of the future specialist.

According to M.N. Kathanov and V.V. Karpov "module – is an interdisciplinary organizational and methodological structure of teaching material, that provides for the extraction of semantic concepts in accordance with the structure of scientific knowledge; the structuring of information from the point of logic of the cognitive activity of a future specialist."

The aim of the module as a structural unit of the discipline's working curriculum is to create conditions for students to assimilate the knowledge and skills, and the formation of professional personality qualities necessary for the future work of the students as doctors. The advantage of modular training is that the student can work independently with his proposed individual curriculum that includes the target action plan, bank of information and a methodical guidance to achieve the set didactical purposes. The module can be structured. General modules can be divided into particular modules, it can consist of modules of different sizes embedded into each other, up to the basic concepts. As structural units of the educational process, training modules are combined into groups to form a modular program. While teaching the module, the teacher, besides its informing and controlling functions, also serves as a consultant and coordinator while still maintaining its leading role in the pedagogical process.

Many researchers believe that the transition to a modular training involves the increase in the proportion and importance of individual work in the learning process, and requires a significant increase in independence, initiative, creativity and socio-professional activity of future specialists.

In general, the modular training's differences are as follows:

- the learning content is presented in complete and independent complexes (units);
- the didactic purpose is formulated for the student and includes not only an indication of the amount and type of the material being studied, but also on the level of its assimilation;
- the form of communication between the student and the teacher changes, the relationship becomes more equal;
- in the process of working with the module the student independently defines specific goals of educational and cognitive activity and learns the methods to achieve them: planning, self-organizing, self-control and critical self-assessment.

The department of policlinic pediatrics and propaedeutics of childhood diseases with a course of post-graduate education has designed the module «Rational feeding of children» which enabled the staff of the department to develop a unified concept of teaching about feeding of children and adolescents with the programs "Propedeutics childhood diseases", "Polyclinic and emergency pediatrics" and "Pediatrics" for the students of medical and stomatological faculties. The module includes the following sections: Feeding of pre-pregnant and lactating women; Feeding of children under one year; Feeding of children older than one year.

Each unit of the module is provided with educational and methodical complex and a set of nutrition booklets. The work of module is provided by educational films on feeding and nutrition of young children. In general, this modular system enhances the activity of both the students, increasing their motivation to acquire knowledge, and the teachers, forcing them to improve their teaching skills.

All of this demonstrates the prospects of using the modular technology and motivates to proceed to its implementation in the educational process, while maintaining the continuity between the traditional education and innovations. As experience in the use of the modular technology in the educational process is gained, it will be possible to develop the multi-disciplinary integrated courses with the prospect of enhancing their introduction into the educational process. The introduction of the modular system will help to improve the educational process in medical schools, since it would allow the transition from the instructional type of teaching to the type of teaching, which would model and shape the professional activities of a future doctor. The transition to the active forms of learning will allow medical schools to prepare the specialists who will be able to quickly adapt to changing industrial and economic environment.

Thus, the modular training, the main objective of which is to achieve effective results in the assimilation of scientific knowledge and the formation of professional and personal qualities of the future doctors, may be regarded as a promising means of improving the educational process in medical schools.

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SUCCESSFUL USAGE OF COMBINED MOLECULAR GENETICS APPROACH IN DIAGNOSING CYSTIC FIBROSIS

Abstract. Timely diagnosing of cystic fibrosis (CF) is of unmet need as CF is the most frequent hereditary disease of humans with clinically rather unfavourable prognosis in case of late diagnosis. We have performed validation of combined molecular genetics approach (high resolution melting analysis and Sanger sequencing) to detect unknown mutations in *CFTR* gene in neonates with increased immunoreactive trypsinogen levels detected during newborn screening and positive sweat testing.

Key words: cystic fibrosis, molecular genetics, high resolution melting analysis, Sanger sequencing.

Introduction. Multiple molecular genetics approaches for fast and reliable diagnostics of CF have been elaborated over the last years [1, 2]. The task of rapid detection of mutations in *CFTR* genes which lead to CF development is to some extent difficult in case of limited laboratory resource settings which is rather normal for regional Russian territories including Khanty-Ugra region. High resolution melting analysis (HRMA) [3] is one of a few affordable molecular techniques which allows the researcher to perform both *de novo* mutation scanning and genotyping of already known mutations almost in any human gene of interest with low cost and precision. Further Sanger sequencing of exons with altered melting patterns detects suspected mutations thus confirming the CF diagnosis.

Materials and methods: Genomic DNA from dried blood spots (DBS) was obtained using QIAamp DNA Micro kit (Qiagen); high resolution melting analysis (HRMA) was performed using “Precision Melt Software” (Bio-Rad); Sanger sequencing was performed on “GenomeLab GeXP” genetic analyzer (Beckman Coulter) according to manufacturers’ protocols. Heterozygous conversion approach (mixing sample gDNA with wild-type control gDNA, ratio 1:1) was used for testing of homozygous F508del mutants. Primers for PCR and sequencing were adapted with some changes from [4, 5].