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IMPLEMENTATION OF A SYSTEM OF PROFESSIONALLY ORIENTED TEACHING OF MATHEMATICS AND EXPERIMENTAL VERIFICATION OF ITS EFFECTIVENESS

The relevance of this article is due to the fact that the changed socio-economic conditions in the country, competition in the labor market in a new way raise the question of the need to significantly improve the quality of training of modern specialists in the field of engineering and technology.

Increasing automation of modern production, its intensification, the need to improve the quality of manufactured products require a graduate of a technical university to be able to solve the problems of optimizing technological processes and modes on a solid scientific basis, calculate the parameters of their stability, the probability of rejection, and also implement a number of complex tasks of tool design, machines and mechanisms. Such production questions and creative tasks can be successfully solved only on the basis of the wide practical use of mathematical knowledge.

As specially conducted studies and existing practice show, many graduates of technical specialties of universities, unfortunately, do not know how to creatively apply mathematical knowledge to solve new engineering and applied problems.

Key words: *learning, mathematics, system, vocational training, performance testing.*

Introduction. Some young specialists, having come to production, either continue to solve new problems using conservative traditional methods and thus do not provide the necessary progress in production, or are forced to urgently master new methods of mathematical and statistical analysis, optimization of technological processes and calculations. If we raise the question of the reasons for the insufficient ability of graduates of technical specialties of universities to master the mathematical apparatus in the interests of production, then with the greatest probability the answer to this question should be sought in a number of areas.

One of them is the weak connection between teaching a course in mathematics at school, in secondary specialized educational institutions, and in universities with practice, technology, and production. In addition, the school mathematics course does not provide the study of a number of disciplines of junior courses at universities (for example, physics,

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chemistry, theoretical mechanics) at a sufficient scientific level. This clearly affects the discontinuity in the content of school and university courses in mathematics [1].

The reason also lies in the lack of coordination and connection between the teaching of general professional and special disciplines and the teaching of mathematics. Moreover, teachers of general professional and special disciplines, as a rule, make little use of the possibilities of modern mathematics in their courses, and higher mathematics is often taught without regard to major disciplines and specialization of students. As a result, quite extensive and deep mathematical knowledge obtained in school and university courses of mathematics is not used and not consolidated in practice.

To solve the problem of training an engineer who is able to work creatively in modern production in new socio-economic conditions, it is necessary to organize continuous mathematical training of students throughout the entire period of study in secondary and higher schools with the widespread use of mathematics in teaching technology, natural, general professional and special disciplines.

When studying a course of higher mathematics in a technical university, the orientation of students in mastering the knowledge of the course should be aimed at applying them to solve problems of an industrial nature. Meanwhile, the ability to apply knowledge does not come by itself, is not an automatic consequence of the assimilation of theoretical knowledge. The application of theoretical knowledge to solve practical problems must be taught. Theoretical (mathematical) and practical (technical) education are independent and separate links in the cognitive process. Each of them has its own subject of study, its own forms of learning and specific results. In theoretical education, the subject of study is mathematics, in practical education, general professional and special courses. And if you do not take special pedagogically sound measures for their relationship, then mathematical and technological knowledge remains isolated in the minds of students and does not «work» for the formation of professional skills of a future specialist [2].

Main body. The relevance of the problem of professional orientation of mathematical education of students of a technical university is due to the need to: improve the quality of training a professionally mobile specialist competitive in the labor market; increasing the theoretical level of teaching students of technical universities in fundamental, general professional and special disciplines; strengthening the applied nature of teaching mathematics in a technical university; observance of the continuity of the goals, content, forms, methods and means of teaching mathematics with general professional and special cycles of disciplines at a higher technical school [3].

The development of theoretical foundations and methods for the implementation of the professional orientation of teaching mathematics in a higher technical school is associated with the need to resolve a number of shortcomings and contradictions, the essence of which is as follows: on the one hand, there is a duplication of a number of topics in school and university mathematics courses, on the other hand, there is a continuity gap in their content; everywhere there is a significant decrease in the performance of first-year university students in mathematics compared to their performance at school; the school course of mathematics does not provide for the study of a number of disciplines of the junior courses of the university (for example, physics, chemistry, theoretical mechanics) on a sufficient scientific basis; there is a gap in continuity in the methodology of teaching mathematics at school and

at a technical university; the university course of mathematics is weakly connected with the general professional and special disciplines of the curriculum; university graduates are not sufficiently prepared to use the acquired mathematical knowledge to solve technical and technological problems [4].

Today, the contradiction between the social order of society for a specialist who has practical skills in using the mathematical apparatus in professional activities and an insufficiently developed theory and methodology for teaching students to solve production problems at a high scientific level is especially acute. The list of contradictions and shortcomings in the organization of mathematical training of young people in the “school-university” system could be continued. However, even those listed above are obviously enough to show the need for the scientific development of a system of successive and professionally oriented teaching of mathematics in a higher technical school.

The practical significance of the study lies in the possibility of using the results obtained in the system of continuous multi-level education: harmonization of the content of mathematics course programs with general professional and special disciplines of the curriculum of a technical university; phased provision of applied and professional orientation of fundamental courses (mathematics); coordination of pedagogical actions of teachers of the education system and disciplines of the curricula of professional educational institutions. The results of the study are a scientific and practical basis for designing new integrative technologies for preparing future specialists for the upcoming independent professional activities, for the gradual transfer of university students from the phase of formation of the necessary qualities and skills of practical use of mathematical knowledge to solving production problems in the phase of self-formation, creative self-development, consolidation they have a previously made professional choice.

These methodological manuals and recommendations can be used in the development of educational and program documentation, guidelines and manuals, didactic materials that contribute to the achievement of continuity and professional orientation in teaching fundamental disciplines (mathematics) in the system of lifelong education [5].

Reliability and validity of the study were ensured by: a deep analysis of the problem under study, based on the provisions and conclusions of well-known philosophers, educators and psychologists, as well as on the works of modern researchers; the adequacy of research methods to its goals and objectives; representativeness of the sample; conducting scientific research in unity with practical activities and focusing on it; implementation of a systematic approach; a combination of the principles of continuity and professional orientation in training; solution of the tasks set in the study; making adjustments to the hypothesis and organizing experimental work; the author’s personal experience in teaching a mathematics course to students of a technical university and the direct participation of the dissertation student in the experimental work. Testing and implementation of research results. Approbation of the main conclusions of the dissertation research at different stages of work was carried out at scientific and practical conferences, methodological and methodological seminars of the city, regional, all-Russian and international levels on the problems of improving the quality of professional training of specialists in the new socio-economic conditions and the labor market [6].

Conclusion. Following a systematic approach, the paper shows the main directions for transforming the activities of university teachers in designing and implementing a system

of professionally oriented teaching of mathematics to students of a technical university: increasing the mathematical knowledge of teachers of all disciplines of the university curriculum; familiarization of mathematics teachers with the features of technology and technology studied by students; development of programs for the relationship of mathematics with general professional and special disciplines; compilation by mathematics teachers of tasks and assignments for students with technical content, etc.

The study notes that in the process of implementing professionally directed teaching of mathematics to students, it is advisable to design a combination of individual, group work with the work of students in pairs and small groups.

The dissertation notes the expediency of using a structural diagram to acquaint students with the main relationships between the course of mathematics and the disciplines of the curriculum of the university, to diversify the methods of implementing professionally oriented teaching of mathematics in lectures, practical and laboratory classes.

The paper shows that among the means of implementing professionally directed teaching of mathematics, the preparation and conduct of interactive lectures based on the Power Point kit, which allow you to place information in a professionally prepared slide, fill it with graphs, diagrams and illustrations on the manifestation of mathematics in technology and basic enterprise technologies [7].

Studies have shown that in bringing the teaching of mathematics closer to the upcoming professional activities of students, the use of problem-based learning methods is more effective.

The most effective means of implementing professionally oriented teaching of mathematics to students of technical universities are tasks and assignments that model the most priority activities of an engineer: design, production, technological, organizational and managerial, and research. Based on the characteristics of the types of professional tasks for each type of engineer's activity in the process of research with the participation of teachers of special disciplines, tasks and tasks of a professional orientation were compiled for most sections of the mathematics course. Tasks and assignments were compiled on the basis of following a number of principles: accessibility, taking into account the fact that students have not yet studied special subjects, the gradual complication of the proposed tasks, and the principle of connecting theory with practice. They were built on the basis of relatively simple technical and technological models and contained elements of research activities.

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МАТЕМАТИКАНЫ КӘСІБИ БАҒЫТТАЛҒАН ОҚЫТУ ЖҮЙЕСІН ІСКЕ АСЫРУ ЖӘНЕ ОНЫҢ ТИІМДІЛІГІН ТӘЖІРИБЕЛІК-ЭКСПЕРИМЕНТТІК ТЕКСЕРУ

Бұл мақаланың өзектілігі елдегі әлеуметтік-экономикалық жағдайлардың өзгеруіне, еңбек нарығындағы бәсекелестікке байланысты техника мен технология саласындағы заманауи мамандарды оқыту сапасын жақсартуға қажеттілігі туралы мәселені жаңаша қояды.

Қазіргі заманғы өндірісті автоматтандырудың күшеюі, оның күшеюі, шығарылатын өнімдердің сапасын арттыру қажеттілігі техникалық университеттің түлегінен технологиялық процестер мен режимдерді оңтайландыру мәселелерін ғылыми негізде шеше білуді, олардың тұрақтылық параметрлерін, ақаулардың пайда болу ықтималдығын есептеуді, сондай-ақ құралдарды, машиналар мен механизмдерді жобалаудың бірқатар күрделі міндеттерін жүзеге асыруды талап етеді. Мұндай өндірістік мәселелер мен шығармашылық есептер математикалық білімді кең практикалық қолдану негізінде ғана сәтті шешілуі мүмкін.

Арнайы жүргізілген зерттеулер мен қолданыстағы тәжірибе көрсеткендей, жоғары оқу орындарының техникалық мамандықтарының көптеген түлектері, өкінішке орай, жаңа инженерлік және қолданбалы есептерді шешу үшін математикалық білімді шығармашылықпен қолдана алмайды.

***Түйін сөздер:** оқыту, математика, жүйе, кәсіби бағытталған оқыту, тиімділікті тексеру.*

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РЕАЛИЗАЦИЯ СИСТЕМЫ ПРОФЕССИОНАЛЬНО-НАПРАВЛЕННОГО ОБУЧЕНИЯ МАТЕМАТИКЕ И ОПЫТНО-ЭКСПЕРИМЕНТАЛЬНАЯ ПРОВЕРКА ЕЕ ЭФФЕКТИВНОСТИ

Актуальность данной статьи обусловлена тем, что изменившиеся социально-экономические условия в стране, конкуренция на рынке труда по-новому ставят вопрос о необходимости значи-

тельного повышения качества подготовки современных специалистов в области техники и технологии.

Усиливающаяся автоматизация современного производства, его интенсификация, необходимость повышения качества выпускаемых изделий требуют от выпускника технического вуза умения на солидной научной основе решать задачи оптимизации технологических процессов и режимов, рассчитывать параметры их устойчивости, вероятности выхода брака, а также создавать в жизнь ряд сложных задач конструирования инструментов, машин и механизмов. Такого рода производственные вопросы и творческие задачи могут успешно решаться лишь на основе широкого практического использования математических знаний.

Как показывают специально проведенные исследования и существующая практика, многие выпускники технических специальностей вузов, к сожалению, не умеют творчески применять математические знания для решения новых инженерных и прикладных задач.

Ключевые слова: обучение, математика, система, профессионально-направленное обучение, проверка эффективности.