

Review Article

PROBLEMS OF STUDYING AND TEACHING MATHEMATICS IN A TECHNICAL UNIVERSITY

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Abstract

The article identifies three main problems of mathematical education in Russia: low educational motivation of students, the content of mathematical education, not enough teachers of higher education educational organizations. Such a concept allowed the author to consider the main problems of the mathematical education of future engineers. The conditions that influence the success of the study and training of mathematics are determined by the example of the Surgut branch of the Tyumen Industrial University, Omsk State Technical University.

Keywords: mathematics, students, teachers, problem, main tasks, motivation.

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INTRODUCTION

Many often ask the question: "Why do we need mathematics?" Often the fact that this discipline is included in the compulsory program of universities and schools puts people at a loss. This perplexity is expressed in the following: Like, why do I, a person whose future (or current) profession will not be connected with conducting calculations and using mathematical methods, know mathematics? How can I find this useful in my life? Thus, a large number of people do not see any sense for themselves in mastering this science, even on elementary principles.

Mathematics is a fundamental science, the methods of which are actively used in many natural disciplines, such as physics, chemistry and even biology. By itself, this field of knowledge operates with abstract relationships and interconnections, that is, entities that are not material in themselves [16-18].

But, nevertheless, only mathematics should enter the field of any science about the world around us, it immediately turns into a description, modeling and prediction of concrete and real natural processes. Here she gains flesh and blood, coming out from under the cover of idealized and divorced formulas, and calculations.

It is a science of exact, impatient arbitrariness in interpretation and various speculations. This is the embodiment of order and rigid logic. It helps to understand the world around us, to learn more about its orders, since these orders obey the same laws that prevail in mathematics!

Mathematics occupies a special place in science, culture and social life, being one of the most important components of world scientific and technological progress [2]. The study of mathematics plays a system-forming role in education, developing cognitive abilities person, including logical thinking, influencing the teaching of other disciplines. High-quality mathematical education is necessary for everyone for his successful life in modern society. Developed countries and countries currently making technological breakthroughs are investing significant resources in the development of mathematics and mathematical education.

PROBLEMS OF TEACHING MATHEMATICS

The concept of mathematical education of the Russian Federation pointed out three basic problems of mathematical education.

1. Low learning motivation of students is associated with a public underestimation significance mathematical formation, congestion educational programs general

education and professional education, and evaluation of teaching materials and technical elements and outdated content [3].

2. The content of mathematics education. The choice of the content of mathematics education at all levels of education continues to become obsolete and remains formal and detached from life, broken his continuity between education levels.
3. The personnel problem. In the Russian Federation are not enough teachers of educational institutions of higher education, which can qualitatively teach mathematics, considering forming and developing educational and vital interests of different groups of students. The current system of training, retraining and advanced training of teachers does not meet current needs. The system of additional vocational training of teachers is not effective enough and often just a formality in terms of improving mathematical education [1].

The main problems of the university associated with the assimilation of mathematical objects arise primarily because of the decline in the quality of mathematical preparation of school-leavers. secondary education, the quality system is subject to massive criticism. Despite the obvious advantages of the unified state examination, the level of training in mathematics at school did not increase, but declined [8]. Yesterday's students often do not know how to do such a simple transformation as the addition of fractions, the solution is simple math equations, not to mention the construction of graphs of functions or knowledge of the properties of the elementary functions of sine, cosine, exponential or logarithmic function. There are several reasons for the deterioration of the situation in the school:

1. Reduce hours allocated to the study of mathematics in school, and the consequence was a change in the content of the subject areas. A number of important topics necessary for the training at the university considered as a trial order or not treated at all [9]. For example, much of the material studied in algebra, basic trigonometry principles of mathematical analysis, and the geometry in the space accounts for 10-11. A large amount of content covered by the training at the level of recognition and concepts, the students stopped to prove theorems and deduce the formula. There is no complication of the content and tendency to erosion, causing a threat to the gradual loss of a clear logical structure of such subjects as mathematics, physics and others.

2. Mechanical "coaching" the CSE tests, practice lately, does not stimulate the development of analytical and logical thinking, and does not contribute to understanding the essence of phenomena [15].
3. The curriculum is virtually absent interdisciplinary synthesis, ie transfer basic knowledge of mathematics in other areas (physics and others).
4. Low motivation of students learning activity.
5. Experiments of new educational programs in secondary schools over the past decade have led to the loss of the systems in the field of natural science knowledge [13]. Catastrophically low knowledge of mathematics and physics at the university entrants lead to numerous negative consequences in the field of higher education.
6. A certain number of students studying mathematics, are graduates of humanities education schools. They do not understand that mathematics - the language in which humanity learns the physical picture of the world [14]. For these applicants several important in operations such as logarithm and potentiation of formula 18, converting trigonometric expressions, function theory, plotting remain "terra incognita."
7. One of the reasons for the deterioration of training in mathematics at the university is also a reduction in teaching load in mathematics. This often occurs when the introduction of new state standards in some areas and processing of curricula [11].

MAIN OBJECTIVES OF MATHEMATICS EDUCATION OF ENGINEERS

In this regard, manifested in recent years, a sharp decline in the level of mathematical preparation of students seems appropriate, especially in primary schools to reduce the ideological and abstract conceptual load, increasing the time to address text and other sense (practical) problems. The specific content of the tasks and the use of it is arithmetic (for actions) rather than algebraic methods for solving them will contribute to the development of basic skills among the students logical thinking [10]. Should be retained in primary and high school tasks for solving equations and inequalities, both algebraic and irrational, trigonometric, logarithmic, exponential. These tasks are taught to work with functions. They are readily available for understanding the school (of course, subject to the measure of complexity) but it requires a certain culture perform algebraic manipulations. It is this culture lacks many entrants - and it is necessary to continue in high school to teach them to do more complex things: calculate integrals and derivatives, to investigate the function of the extremum, solve differential equations, and more. It is necessary to return the attention of pupils and caring attitude of teachers to the study of geometry - this unique for her role in mathematics education subject. A variety of geometric problems, plenty of ideas, the rigor of reasoning are taught to think logically, develops imagination, intuition, creative abilities of pupils [5]. Must be moved to a later time, or better yet, remove all of the basic mathematical education all the material related to the theory of probability and mathematical statistics, combinatorics, set theory and logic, as well as everything related to the formal side of the differential and integral calculus. The study of mathematics at the school should not be too formalized, unmotivated contain general concepts and design, turn into memorizing texts. It should be based on available school children accompanied by reasoning and evidence feasible. Absorption of the material should contribute to increase in the time to solve problems [4]. Arriving at the school, yesterday's students already can not fully master the training program. In our opinion, it is necessary to correct the situation, including the complement traditional forms, methods and techniques of scientific and educational activities in a technical college with innovative pedagogical and information technologies. It is necessary to introduce new educational technologies,

WAYS TO SOLVE PROBLEMS

In order to provide high-quality mastering the ever-increasing volume of material in one and the same time, training in high school, the need to restructure not only the course of mathematics, but also other general professional and special disciplines using mathematical apparatus and secures the mathematical knowledge. This concept allows us to consider the following basic tasks of mathematical education of future engineers.

1. Mathematics Education must ensure all students acquire the knowledge level sufficient for the implementation of the goals of mathematics education and formation of personnel potential of the society, prepared to work in a market economy [12].
2. The contents of mathematical education of future engineers should be a system of knowledge - concepts, statements, methods and techniques of reasoning, ordering that allows us to solve modern problems of mathematical education with the humanitarian nature and is aimed at the intellectual development of the individual, is to form the students' ability to learn new knowledge to the independent search for and mastery of the new information [12]. Methodology of teaching mathematics system must be reconstructed on the priorities of developing teaching function in relation to education and provide: the mastery of complex knowledge and skills needed for studying at the present level of natural science and humanities, general and special disciplines, and for professional activities.

METHODS OF SOLVING THE PROBLEMS ON THE EXAMPLE OF RUSSIAN UNIVERSITIES

The first possible solution to this problem is to use currently widely used rating system. In schools, at the time the exam future students get acquainted with the 100-point rating system, a later in high school, for example, in the Surgut branch of the TIU, has a system that is prostanovka points for each operation. In this case, points are distributed in such a way that during the semester the student is gaining 40 to 60 points and 20-40 points - the exam / competition. It should be noted that any intermediate certification in the form of points or assessments on the part of students cognitive interest increases due to the competitive moment. However, to date, 100-point evaluation system works is artificial, since the certificate and the record book, is still score, converted to 4-point scale: "excellent", "good", "satisfactory".

Second, increase the motivation of the learning process can be, raising the competitive spirit, touching on issues of self-affirmation of the individual self-learning. To date, actively promoted the ideas and methods of incorporating gaming moments in high school educational process [6]. Competitive point - the point of the game is inherent in the people throughout life, at any age. From a very young age a person perceives the world and learn while playing. The so-called gamification of learning actively used today in the educational process at all levels of education. She accompanies childishness that still inherent in first-year students. Today's students are spoiled with all sorts of gadgets and interactive games, presentations, and do not take the more study of theoretical material on the benefits and text files. Im bored just watching videos, most interesting to cooperate actively with the studied material. For example, one active measures can be lectures, interrupt presentation information theoretical interactive testing. Questions for all the same, they can be actively discussed all together and then find the right answer. Such testing does not have the psychological pressure, at the same time helps to clarify the problematic issues.

Addition to the business game are "Days of Science", which are held in high schools once or twice a year. They include the preparation is not a particular student, but to help interested groups to study their interesting subject. It is possible to combine the work of the Club of interest in the department or scientific work within NIRS (research work of students) aim is the same - increase the motivation to learn through the use of

non-standard methods of studying the material - students independently study any aspect and convey the information to a friend Ruga. The teacher in this case acts as a consultant, his personality does not prevail over the students. This reduces the intensity of the learning process, and increases the interest of students. This club (computer graphics enthusiasts) operates in Omsk State Technical University (Omsk State Technical University) at the Department of Engineering and CAD geometry "for the third year. And the students have a keen interest, which is not reduced when the study of the subject is completed, i.e. e., they visited the club and on the second, third, etc. courses.

CONCLUSIONS

From all of the above, a key point can be singled out: it is necessary to interest the student with the discipline in the learning process. The student is not a robot, and filling his brain with information will not work. Even when creating computer databases and knowledge, information is carefully processed, excluded obsolete and redundant, translated electronic form, create certain algorithms for its interaction. Therefore, each teacher must be qualified to timely process information on his subject and use relevant techniques to bring it to students. For example, instead of static files and presentations, webinars and chats are modern active virtual forms of learning, as well as films and animated videos, the creation of which can and should involve students.

It is important that the future engineer is prepared to use mathematics in solving a wide range of problems arising from professional activities.

The engineer needs mathematics, as the database on which the specialist builds his activities, the result of which are fruitful steps in the progressive development of science and technology, in the life support of people, the functionality of the mechanisms and materials surrounding us.

REFERENCES

- Ilyashenko, L.K. (2018). Application of project activities in the theory and practice of Russian universities. *Revista ESPACIOS*, 39 (25).
- Ilyashenko, L.K. (2008). On the formation of professional competence of the future experts of Petroleum resources module-rating system in the process of learning mathematics. *Bulletin of Chelyabinsk State Pedagogical University*, (1).
- Ilyashenko, L.K. (2014). The basic components of mathematical competence of future engineers in the oil and gas business. *Science and business: ways of development*, (10), 13-17.
- Ilyashenko, L.K. (2016). The ratio of the concepts of "readiness" and "competence" to the professional activity of future specialists. *Global Research potential* (7), 10.
- Ilyashenko, L.K. (2018). Distance learning in educational space of Tyumen Industrial University. *MODERN JOURNAL OF LANGUAGE TEACHING METHODS*, 8 (3), 409-416.
- Ilyashenko, L.K., Smirnova, Z.V., Vaganova, O.I., Chelnokova, E.A. & Kaznacheeva, S.N. (2019). Methods of Conducting Practical Training on the Subject "Power Sources for Welding. *International Journal of Mechanical Engineering and Technology*, 10 (02), 908-917.
- Ilyashenko, L.K., Vaganova, O.I., Smirnova, Z.V., Gruzdeva, M.L. & Chanchina, A.V. (2018). Structure and content of the electronic school-methodical complex on the discipline "mechanics of soils, foundations and foundations". *International Journal of Mechanical Engineering and Technology*, 9 (4), 1088-1096.
- Actual problems of teaching mathematics in schools and universities Ugra: Proceedings of the Conference (Khanty-Mansiysk, October 22, 2015) / Ed. I.V. Dolzhenko; Auto. the establishment of additional. prof. education of the Khanty-Mansi. aut. env. - Ugra "Institute of Education Development". - Khanty-Mansiysk: Institute for Educational Development, 2015. - 160p.
- Velikanova, S. (2005). Activation of educational and cognitive activity of students of a technical college in the course of vocational training (Doctoral dissertation, [Magnitogor. State. Univ]).
- Dalinger, V.A. (2005). Problems of improving the quality of training of engineers. *Fundamental research* (9), 55-56.
- Ermolaeva, E. (2010). The problem of assimilation of mathematical knowledge of students of technical colleges. *Actual problems of the humanities and natural sciences*, (7), 270-272.
- Zimin, O. (2006). Problem learning higher mathematics in technical colleges. *Mathematics in higher education*, (4), 55-78.
- Knyazev, O. (2009). The problem of professional orientation of teaching mathematics in technical colleges. *Bulletin of the Tomsk State Pedagogical University*, (9).
- Mamaev, N.A. & Agapov, J.B. (2008). The formation of educational motivation of students of technical colleges. *Bulletin of Astrakhan State Technical University*, (1).
- Technique and technology of teaching mathematics. *Lecture Course: A manual for schools / under scientific. Ed. N.L. Stefanova, N.S. Podhodovoy, - M.: Bustard, 2005.- 280 p.*
- Nogin, V.D. (2001). Mathematics in technical universities: problems and prospects. *Education and science: problems and prospects razvitiya.- St. Petersburg*, 253-261.
- Tel H, Ertekin Pinar S, Daglar G. (2018). Effects of Home Visits and Planned Education on Mothers' Postpartum Depression and Quality of Life. *J Clin Exp Invest.* 9(3), 119-25. <https://doi.org/10.5799/jcei.458759>
- Sarafraz, M., Kiani, M., Bayat, A., Nikakhlagh, S., Karimi, M., Riahi, M., & Saki, N. (2018). Cortical auditory plasticity in children with Cochlear implants. *Electronic Journal of General Medicine*, 15(6).
- Naeem Raza Khawaja, Aamir Mushtaq. "Diabetes Mellitus Type 2. Role of Pharmacist in Subcutaneous Therapy. A Challenge!" *Systematic Reviews in Pharmacy* 8.1 (2017), 1-4. Print. doi:10.5530/srp.2017.1.1
- Samsudeen, A., Sulphay, M.M. Does performance management of medical practitioners stand apart? (2018) *International Journal of Pharmaceutical Research*, 10 (2), pp. 101-106. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85043774593&partnerID=40&md5=4cead8e5a3b57c125044af857bf04a60>