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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ И МЕТОДИКИ ОБУЧЕНИЯ

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<https://doi.org/10.48081/TDMN8232>***N. F. Abayeva¹, L. M. Mustafina², R. Abaev³, B. M. Mustafina⁴**^{1,2}Karaganda Technical University,
Republic of Kazakhstan, Karaganda;³University College London,
UK, London;⁴Al-Farabi Kazakh National University,
Republic of Kazakhstan, Almaty**THE ROLE OF VOCATIONAL GUIDANCE IN IMPROVING
THE QUALITY OF KNOWLEDGE IN MATHEMATICS**

The role of vocational guidance in teaching mathematics in the educational process of economic specialties students is presented. The importance and necessity of obtaining high-quality knowledge of the mathematical approach by students of economic specialties is demonstrated. Today's students, and in near future: specialists in the field of economics should be able to meet the high standards of the modern labor market; they must be interested in obtaining a higher level of knowledge.

The issue of improving the quality of mathematical knowledge is quite acute, and as one of the ways is to stimulate the study of mathematical disciplines, the authors consider the introduction of a professionally-oriented textbook into the educational process. The article provides the structure of this textbook, which contains all the necessary theoretical material, key concepts, and questions for self-assessment, a list of references and a large number of professionally oriented tasks.

Keywords: vocational education, teaching mathematics.

Introduction

On September 5, 2012, the head of the Republic of Kazakhstan visited Nazarbayev University and delivered a lecture to the students, where he noted that our country is moving towards a post-industrial world ruled by the triad «education – science – innovation». Nursultan Nazarbayev emphasized: «There

is one more enduring value, the pursuit of knowledge. World experts predict an acute shortage of qualified personnel. According to forecasts, by 2020 the world labor market will need an additional 40 million workers with higher education. Look, following countries as Japan, China, South Korea, Singapore, Malaysia are thriving thanks to the skill of the execution of their ideas and technologies, their perseverance and work. Your knowledge is the result of your work. If you work, strive for self-education more, you will learn more. We regard knowledge as an economic resource of the state, factor of production. We are consistently modernizing the national education system, bringing it closer to international standards».

President of the Republic of Kazakhstan N. A. Nazarbayev on June 16, 2006, in his address to youth at the L. N. Gumilyov (Nur-Sultan) at the lecture «Towards the knowledge economy through innovation and education» outlined: «It is necessary to qualitatively change the level of teaching at the applied departments of the mathematical direction in all universities. Everyone should be proficient in mathematical methods of data analysis. As world practice shows, a high level of mathematical training of personnel will provide a qualitative breakthrough in all industries. Educated, literate people are the main driving force of human development in the 21st century».

An economist to successfully apply mathematical methods in further professional activity, to model various economic processes; first of all, he must obtain the necessary knowledge and be able to correctly handle the mathematical apparatus. Mathematical methods play an increasingly important and necessary role in the training of specialists in the field of economics, since they allow to analyze the results of theoretical and practical activities with a sufficient degree of reliability. They are used to process observational and experimental data that are not only susceptible to measurement errors and random interference, but also to the influence of internal variability.

Materials and methods

At Karaganda Technical University, the mathematical training of students of an economic profile is considered as an important component in the system of basic training of a modern specialist in this field, the primary task of which is high-quality training of students, focused on developing the ability to obtain and apply knowledge in professional practice independently.

However, as practice shows, the role of mathematics in the process of preparing a future economist is inconspicuous, since in all cases, economic disciplines are naturally brought to the fore, and theoretical disciplines, including mathematics, are depended on the background. This is due to the fact that the educational process of the university does not take into account the rapid mathematization of

all industries, including the economy, which is based on the introduction of new computer technologies, methods based on mathematical achievements in the field of economics. This leads to misunderstanding and neglect of students' study of mathematics. Thus, economics students underestimate the role of mathematics in their future professional career.

Improving the quality of mathematical knowledge is a problem faced by teachers of the disciplines «Mathematics in Economic» and «Additional chapters of mathematics». For this purpose, we analyzed psychological and pedagogical literature in order to identify ways and means of increasing the level of mathematical knowledge. Among the variety of ways and means developed by practice for the formation of sustainable cognitive interests, they are following:

- passionate teaching,
- the novelty of the educational material,
- demonstration of the practical application of knowledge in connection with the life plans and orientations of students,
- the use of new and non-traditional forms of education,
- alternation of forms and methods of teaching,
- problem learning,
- heuristic learning,
- the use of interactive computer tools,
- testing knowledge, skills, and etc.

Considering the above, the formation and development of interest in mathematics among students studying in economic specialties is a task of value importance, the intellectual development of students, the development of basic methods of thinking, the formation of cognitive abilities and research skills are achieved on the solution.

To educate an economist student's interest in mathematics, to achieve knowledge of the subject, to promote the development of his creative abilities, skills and abilities is the task assigned to the teacher of mathematics.

Therefore, we consider solving this problem, it is necessary:

- 1) to increase attention to teaching methods: methods that stimulate the activity of students, educate them the skills of independent work, should receive the maximum development;
- 2) revise the methodology of presenting lectures and practical exercises in order to strengthen interdisciplinary connections on special disciplines in the educational process of the university.

To solve this problem, the process of studying the discipline «Mathematics» was studied in detail. The educational literature is analyzed, since it is through the textbook that the process of assimilating the content of education is organized both

in terms of cognitive, independent creative activity, and in the emotional-value relation. The textbook is designed to form the ability of students to accumulate personal social experience, to form his ability to evaluate the phenomena and events of the surrounding reality, to determine their place in life.

Results and discussion

After analyzing the educational literature on mathematics for students, economic specialties, we came to the following conclusion: the change in the role of mathematics in education, its approval as a language and the most important tool for learning and solving practical problems should be reflected in the entire system of higher economic education. Mathematics in this education system has stepped over the level of general education discipline and should, on the basis of interdisciplinary ties with special economic disciplines, become an integral part of professional training.

As a result of studying a course in mathematics, a future economist must master mathematical knowledge as an apparatus that helps to simulate economic problems and to solve the constructed mathematical model, as well as analyze the obtained solution; and to use computer technology if it is necessary. He must also master mathematical methods that make it possible to study and predict economic processes.

The basics of economic and mathematical modeling, which an economist student must master, give an idea of economic and mathematical modeling, its language and symbols, methods, algorithm, periods of development of economic and mathematical modeling; be able to build models of real economic processes, study these processes according to these models, design applications of models; get acquainted with the role of economic and mathematical modeling in the modern economy.

An economics student needs to have a thorough knowledge of the theory of probability and mathematical statistics; be well acquainted with linear and nonlinear programming methods, dynamic programming, game methods, network planning, problems of queuing theory and other economic and mathematical methods and models, as well as econometric methods. But, despite of the need for mathematical knowledge, it is quite difficult for a first year student to study mathematics to explain why he needs mathematical knowledge.

To improve the desire to study mathematics, it is necessary to develop the student's need to engage in cognitive activity, which means the student-economist must find attractive aspects so that the learning process contains positive charges of interest in the study. Therefore, the solution of professionally oriented problems in the process of studying mathematics demonstrates the degree of need for

possessing mathematical knowledge; tasks of this type are solved on practical knowledge, for example:

1 The bank operates in 6 branches of the city. The bank has recruited 3 new employees who need to be assigned to these branches. There are many ways to do this if you can add only 1 new employee to each branch.

2 This branch of the bank employs 12 people. 8 people as 4-year students came to the bank for internship, which must be distributed among the bank's employees. Define how many ways this can be done if only 1 student can be assigned to one bank employee.

3 The probability of obtaining a mortgage loan subject to all the conditions of the bank is 0.9. Find the probability that 154 out of 180 clients receive a mortgage.

4 During the financial control, 5000 clients of the bank were checked. Of these, 7 clients had a lower rate, 53 clients had violations of the debt repayment schedule, 4 clients had errors in paperwork, 5 clients had no loan repayment, 21 clients had early loan repayment, 3 clients had lost documents. Find the distribution law of the identified shortcomings in the bank's work.

5 The occurrence of violations in the work of the planning and economic department at a certain enterprise is estimated by the probability 0.7. Draw up the binomial distribution of the probabilities of the occurrence of violations in six randomly taken cases of the work of the planning and economic department.

Over the past two years, in the educational process, we have been using the professionally oriented textbook "Probability theory and mathematical statistics for students of economic specialties», approved by the academic council of the university. The structure of this textbook is composed as follows: at the beginning of each chapter, the necessary theoretical material is set out, which will allow the student to successfully prepare for classes, all content is accompanied by professionally oriented examples (Fig. 1).

ГЛАВА 1. ОСНОВНЫЕ ПОНЯТИЯ КОМБИНАТОРИКИ

1.1	РАЗМЕЩЕНИЯ, ПЕРЕСТАНОВКИ, СОЧЕТАНИЯ
	1.1.1 ПРАВИЛА УМНОЖЕНИЯ И СЛОЖЕНИЯ
	1.1.2 РАЗМЕЩЕНИЯ
	1.1.3 ПЕРЕСТАНОВКИ
	1.1.4 СОЧЕТАНИЯ

1.1.1 ПРАВИЛА УМНОЖЕНИЯ И СЛОЖЕНИЯ

Определение. Комбинаторика - это раздел математики, изучающий вопрос о том, сколько комбинаций определенного типа можно составить из данных элементов.

Правило умножения. Пусть требуется выполнить одно за другим какие-либо k действий. Если первое действие можно выполнить n_1 способами, второе действие n_2 способами и так до k -го действия, которое можно выполнить n_k способами, то все k действий вместе могут быть выполнены $n_1 \cdot n_2 \cdot \dots \cdot n_k$ способами.

ПРИМЕР 1. С целью получения гранта для обучения по программе «Болашақ» необходимо выбрать два студента одного курса, из участвующих 20 студентов 1 курса и 30 студентов второго курса. Сколько способов отбора двух студентов возможно в данной ситуации, если учитывать порядок выбора студентов?

Р е ш е н и е. Условимся первым действием считать выбор студентов 1-го курса, а

Figure 1 – Theoretical part

The presentation of the theory ends with key concepts (Fig. 2),

**КЛЮЧЕВЫЕ ПОНЯТИЯ**

Случайные события, виды событий

Испытания

Figure 2 – Key concepts

Questions for self-control (Fig. 3),

 ВОПРОСЫ ДЛЯ САМОКОНТРОЛЯ

1. Что понимается под испытанием?
2. Дайте понятие события.
3. Какие события называют достоверными, а какие невозможными?

Figure 3 – Questions for self-control

A list of literature (Fig. 4),



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Figure 4 – References

And a large number of tasks; which allows to use the textbook as a book of tasks (Fig. 5).

**ЗАДАЧИ**

1. Во время проведения финансового контроля было проверено 5000 клиентов банка. Из них у 7 обнаружен заниженная ставка, у 53 – нарушения графика погашения задолженности, у 4 – ошибки в оформлении документов, у 5 – не возврат по кредиту, у 21 – досрочное погашение кредита, у 3 – потеряны документы. Найти закон распределения выявленных недостатков в работе банка.
2. Появление нарушений в работе планово-экономического отдела на некотором предприятии оценивается вероятностью 0,7. Составить биномиальное распределение вероятностей появления нарушений в шести наугад взятых случаях работы планово-экономического отдела.

Figure 5 – Tasks

The introduced educational process developed by us with the textbook «Probability theory and mathematical statistics for students of economic specialties», this textbook allows to prepare for both lectures and practical classes, as well as to engage in extracurricular independent work.

The structure of the textbook also implies the preparation of the student for the exam. The exam is conducted in the form of a written test, which consists of professionally oriented tasks and theoretical questions.

Conclusions

Based on the above, we can state owing to the professional orientation of the course «Additional chapters of mathematics» at all stages of training, as well as the introduction into the educational process of the professionally oriented textbook developed by us «Probability theory and mathematical statistics for students of economic specialties», the overall level of student performance for the last 2018–2019 and 2019-2020 academic years increased by an average of 9 % in the following economic specialties of our university: economics, accounting and audit, management, marketing.

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*Н. Ф. Абаева¹, Л. М. Мустафина², Р. Абаев³, Б. М. Мустафина⁴

^{1,2}Қарағанды техникалық университеті,
Қазақстан Республикасы, Қарағанды қ.

³Университет колледжі Лондон,
Ұлыбритания, Лондон қ.

⁴Әл-Фараби атындағы Қазақ ұлттық университеті,
Қазақстан Республикасы, Алматы қ.

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МАТЕМАТИКАДАН БІЛІМ САПАСЫН АРТТЫРУДАҒЫ КӘСІБИ БАҒДАРЛАУДЫҢ РӨЛІ

Экономикалық мамандықтар студенттерінің оқу процесінде математиканы оқытуда кәсіби бағдарлаудың рөлі көрінеді. Экономикалық мамандықтар студенттерінің математикалық аппараттан сапалы білім алудағы маңыздылығы мен қажеттілігі көрсетіледі. Бүгінгі студенттер, ал болашақта экономика саласындағы мамандар қазіргі заманғы еңбек нарығының жоғары стандарттарына сай болуы үшін олар жоғары білім алуға мүдделі болуы керек.

Математикалық білімнің сапасын жақсарту мәселесі өте өткір және авторлар математикалық пәндерді оқуда ынталандырудың бір әдісі ретінде оқу процесіне кәсіби бағытталған оқу құралын енгізуді қарастырады. Мақалада осы оқу құралының құрылымы келтірілген, онда барлық қажетті теориялық материалдар, түйін сөздер, өзін-өзі бақылау сұрақтары, әдебиеттер тізімі және көптеген кәсіби бағытталған тапсырмалар бар.

Кілтті сөздер: кәсіби бағытталған оқыту, математиканы оқыту.

*Н. Ф. Абаева¹, Л. М. Мустафина², Р. Абаев³, Б. М. Мустафина⁴

^{1,2}Карагандинский технический университет,

Республика Казахстан, г. Караганда;

³Университет колледж Лондона,

Великобритания, г. Лондон;

⁴Казахский национальный университет имени аль-Фараби,

Республика Казахстан, г. Алматы.

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РОЛЬ ПРОФЕССИОНАЛЬНОЙ ОРИЕНТАЦИИ В ПОВЫШЕНИИ КАЧЕСТВА ЗНАНИЙ ПО МАТЕМАТИКЕ

Представляется роль профессиональной ориентации при обучении математике в учебном процессе студентов экономических специальностей. Демонстрируется значимость и необходимость в получении качественных знаний математического аппарата студентами экономических специальностей. Для того чтобы сегодняшние студенты, а в будущем – специалисты в области экономики, отвечали высоким стандартам современного рынка труда они должны быть заинтересованы в получении более высокого уровня знаний.

Вопрос повышения качества математических знаний стоит достаточно остро, и как один из путей стимулирования при изучении математических дисциплин авторы рассматривают внедрение в учебный процесс разработанного профессионально-ориентированного учебного пособия. В статье приводится структура данного учебного пособия, которое содержит весь необходимый теоретический материал, ключевые понятия, вопросы для самоконтроля, перечень литературы и большое количество профессионально-ориентированных задач.

Ключевые слова: Профессионально-ориентированное обучение, обучение математики.

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Торайғыров университеті

140008, Павлодар қ., Ломов к., 64, 137 каб.

«Toraighyrov University» баспасы

Торайғыров университеті

140008, Павлодар қ., Ломов к., 64, 137 каб.

8 (7182) 67-36-69

e-mail: kereku@tou.edu.kz

pedagogic-vestnik.tou.edu.kz