

ABSTRACT

on the dissertation of Kalybekova Zhanar Abdyhaliyevna submitted for the degree of Doctor of Philosophy (PhD) in the educational program "8D01501 – Mathematics"

Research topic: methodological features of professionally oriented teaching of mathematics to students at technical universities.

Purpose of the research: development of methods for vocationally oriented teaching of mathematics to students at technical universities.

Objectives of the research:

- to analyze the current state of preparation of students at technical universities for professional activities.

- to analyze the problem of the professional orientation of teaching mathematics in technical universities.

- to identify the structure and content of teaching mathematics to students at technical universities.

- to develop a methodology for organizing professionally oriented training in mathematics to students - future engineers and check their effectiveness in the course of experimental work.

Research methods: analysis of scientific and theoretical problems of teaching mathematics in a technical university, as well as philosophical, psychological, pedagogical, methodological and mathematical literature on the basis of state compulsory standards of higher education; working curricula, educational and methodological complex in mathematics for various specialties; educational and methodical literature on mathematics; study and generalization of the experience of teaching mathematics in technical universities (observation of students, conversations with teachers); testing the hypothesis of the study on the basis of conducting experimental work and processing its results; testing of research results at methodological seminars and scientific and practical conferences.

The main provisions submitted for defense (proven scientific hypotheses and also conclusions that are new knowledge):

1. Theoretical provisions underlying the implementation of the professional orientation of teaching mathematics to students at technical universities.

2. The content and methods of organizing professionally directed training in mathematics for students-future engineers.

3. Experimental substantiation of the effectiveness of the developed methodology for teaching mathematics in a technical university.

Description of the main results of the study:

1. A study of the state of preparation of students at technical universities for professional activity was carried out; the content of curricula in mathematics of various technical specialties is analyzed; an analysis of the

problem of the professional orientation of teaching mathematics in technical universities is carried out.

2. The content of the mathematics course was constructed, aimed at mastering the key and subject competencies necessary for future professional activities for students of the following specialties:

- 6B07311 - Architecture of residential and public buildings
- 6B07312 – Urban Planning
- 6B07321 - Calculation and design of buildings and structures
- 6B07322 - Technology of industrial and civil construction
- 6B07323 - Design and installation of metal structures
- 6B07324 - Economics and management in construction
- 6B07352 - Water supply and sewerage
- 6B07351 - Heat and gas supply and ventilation
- 6B07361- Manufacture of building materials, products and structures
- 6B07371 - Geodesy and cartography
- 6B07501 - Cadastre
- 6B07211 - Technology of woodworking and wood products (by field of application).

3. A methodology for organizing professionally directed training in mathematics for students-future engineers has been developed and its effectiveness in the course of experimental work has been checked. In particular, the methodological features of teaching the course of mathematics in technical universities are described, such as the use of active methods that are most effective in the implementation of the developed methodology of professionally directed training.

Novelty and importance of the results obtained:

The first result is new, since on the basis of theoretical and practical analysis, a modern system of substantive and methodological components of the professional orientation of teaching mathematics to students of technical universities has been revealed.

The second result is new, as the important substantive aspects and methodological support of the structure, and the content of mathematics training, aimed at training future engineers in a technical university, have been improved.

The third result is new, since based on theoretical and practical research, a methodology for organizing professionally directed training in mathematics to students - future engineers has been developed, methodological recommendations and computer software tools for teaching mathematics in technical universities have been proposed.

Compliance with the directions of development of science or state programs: the study was conducted in accordance with the requirements of regulatory documents and the development of education in Kazakhstan, as well as the directions of scientific research, such as the law "On Education" of the Republic of Kazakhstan; concept for the development of higher education and

science in the Republic of Kazakhstan for 2022-2026; the national project "Quality Education "Educated Nation"; Address of the Head of State to the people of Kazakhstan dated September 1, 2021 "Unity of the people and systemic reforms - a solid foundation for the prosperity of the country"; state compulsory standard of higher education of the Republic of Kazakhstan; educational programs, working curricula, educational and methodological complexes; philosophical, psychological, pedagogical, methodical works on the problems of education and training in mathematics.

The contribution of the doctoral student to the preparation of each publication (the contribution of the author of the dissertation is shown as a percentage of the total volume of the publication):

The content of the thesis is reflected in 14 scientific works:

1. Clusters in the gas dynamics and mathematical modeling in mathcade the results of the study// International Journal of Engineering and Technology (UAE). - 7(3.15 Special Issue 15). - Dubai, 2018. – P.320-323 (Scopus). (Co-authored by: Tashimbetova A., Rysbaeva, A., Suleimenov, Z., Sydykova, 30%).

2. Theoretical foundations of the professional direction of teaching mathematics course in higher educational institutions// Global and Stochastic Analysis. - №8(2) (July-December). - 2021. - P.311–322. (Scopus). (Co-authored by: Abylkassymova A.E., Zhadrayeva, L.U., Tuyakov, Y.A., Iliyassova, G.B, 60%).

3. Zhogary oku oryndarynda mathematics courses kasibi bagytta okytudyn keibir aspektili Vestnik KazNPU named after Abai. Series "Fisiko-mathematical sciences". – Vol.77. – No 1. – Almaty, 2022. – P.165-171. (Co-authored: A E.Abylkassymova, L.U.Zhadraeva, 90%);

4. Implementation of a system of professionally oriented teaching of mathematics and experimental verification of its effectiveness// Вестник Национальной инженерной академии Республики Казахстан. - № 2 (84). – Алматы, 2022. - С.133-138. (В соавторстве: А.Е.Абылкасымова, В.А.Смирнов, 90%).

5. On the didactic principles of professionally directed teaching of mathematics to students at technical universities // Bulletin of the National Academy of Sciences of the Republic of Kazakhstan. -№ 4(398). –Almaty, 2022. - С.5-20. (Co-authored: A.E.Abylkassymova, 90%);

6. Mathematics in higher educational institutions with the use of the Geogebra program // Scientific and technical journal "News of Science of Kazakhstan". - Almaty, 2017. -С.61-68. (100%).

7. "GEOGEBRA" program of the 2nd retti kisyktar kasiyterin zertteu // Scientific journal Bulletin of the Kazakh Head of Architecture and Construction Academy. -№4(66). -Almaty, 2017. - S.181-186. (100%).

8. GeoGebra bagdarlamasy – yerkin taralatyn dynamics geometryalyk orta // Collection of materials of the international scientific and methodological

conference "Modern concepts of science and education". – Almaty: IOC KazGASA, 2018. -S.36-40. (100%).

9. Some features of the use of Internet resources in mathematics // Collection of materials of the international scientific and practical conference "Modern trends in architecture and construction: energy efficiency, energy saving, BIM technologies, problems of the urban environment". – Almaty: IOC KazGASA, 2019. –P.490-494. (Co-authored: Sydykova D.K., 80%).

10. Methodological problems of teaching mathematics in technical universities // Scientific journal Bulletin of the Kazakh Head Architecture and Construction Academy. -No2(76). - Almaty, 2020. – P.299-304. (100%);

11. Professionally oriented programs for teaching mathematics in higher educational institutions // Collection of materials of the international scientific and methodological conference "Modern concepts of science and education". – Almaty: IOC KazGASA, 2020. -P.539-544. (100%).

12. Electronic textbook. Mathematics - I. Collection of tasks for the implementation of ISW- Almaty: KazGASA, 2018. - 62 p. (In co-authorship: Sydykova D.K., Seitova A.A., 60%).

13. Электрондық оқулық. Математика-II. СӨЖ орындауға арналған есептер жинағы Алматы: ҚазБСҚА, 2019.- 49б. (Co-authored: Sydykova D.K., 80%).

14. Laboratory workshop in higher mathematics to perform ISW using the GeoGebra program. - Almaty: KazGASA, 2021. - 64 p. (100%).