

Eurasia Journal of Mathematics, Science and Technology Education 2017 vol.13 N8, pages 4379-4391

Training of engineers in mathematics at university on the basis of the information cybernetic approach

Konysheva A., Ibragimova E.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2017 Authors. The relevance of the presented research is conditioned by the necessity of continuous formation of a competitive personality. The competitiveness of the state in the world market is caused by the level of transport and energy infrastructure, the level of training and qualification of the country's engineers. These have determined the task currently being decided by educational organizations to find new resources for training of highly qualified specialists for the diverse industries to develop. Analyzing the multicomponent training of future engineers, experts note the pedagogical potential of mathematical disciplines in the formation of professional competence of engineers. The potential of the cyber-information approach in the training of engineers at university is disclosed and justified in the article, the potential is represented by a combination of the following resources: motivational-adaptive, subjective, integrative, managerial. The authors developed the author's method of training of future engineers in mathematics at university on the basis of the information-cybernetic approach, represented by successively implemented modules: "I get to know myself." "Intellectual puzzle", "Entertaining modeling", "Creative laboratory". The effectiveness of the developed methodology was proved in the course of the experimental research carried out from 2012 to the present time and the experimental training in mathematics at university using the didactic potential of the information cybernetic approach. The materials of the article can be useful in practical terms for university teachers of mathematics striving to significantly improve the level of mathematical training of future engineers.

<http://dx.doi.org/10.12973/eurasia.2017.00933a>

Keywords

Information-cybernetic approach, Subject-subject interaction, Training of students in mathematics at university

References

- [1] Afanas'yev, V. G. (1980). Systemacity and Society. Moscow: Politizdat
- [2] Akhmetov, M. A. (2009). Individually oriented teaching of chemistry in the general education school. Ul'yanovsk: UIPKPRO
- [3] Andreyev, A. A. (2011). Pedagogy in the Information Society, or Electronic Pedagogy. *Vyssheye obrazovaniye v Rossii*, 11,113-117

- [4] Bannikova, T. M. (2012). Professional mathematical training of the bachelor: competence approach. Izhevsk: Izd-vo Udmurtskiy universitet
- [5] Bespal'ko, V. P. (1996). Pedagogy and progressive learning technologies. Moscow: Pedagogika
- [6] Budak, I., & Kaygin, B. (2015). An Investigation of Mathematically Promising Students' Cognitive Abilities and Their Contributions to Learning Environment. EURASIA Journal of Mathematics, Science and Technology Education, 11(1), 25-36
- [7] Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. Journal of Science Education and Technology, 18(1), 7-22
- [8] Gabdrakhmanova, R. G., Khuziakhmetov, A. N., & Yesnazarova, U. A. (2015). The Formation of Values of Education in the Mathematics Teachers of the Future in the Process of Adaptation into University Study. IEJME-Mathematics Education, 10(3), 147-155
- [9] Gershunskiy, B. S. (1998). Philosophy of Education. Moscow: Moskovskiy psikhologo-sotsial'nyy institut
- [10] Gok, T. (2014). Students' Achievement, Skill and Confidence in Using Stepwise Problem-Solving Strategies. EURASIA Journal of Mathematics, Science and Technology Education, 10, 617-624
- [11] Grebenyuk, T. B. (2009). Didactic models for the formation of the student's individuality. Chernyakhovsk: izdatel'stvo GOU SPO KRSPK
- [12] Henningsen, M., & Stein, M. K. (1997). Mathematical tasks and student cognition: classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. Journal for Research in Mathematics Education, 28(5), 524-549
- [13] Iqbal, M. M. & Saleem, Y. (2017). Delay Assessment Framework for Automated Question-Answering System: An Approach for e-Learning Paradigm. EURASIA Journal of Mathematics, Science and Technology Education, 13, 1145-1159. DOI: 10.12973/eurasia.2017.00663a
- [14] Khutorskoy, A. V. (2010). Pedagogical innovative studies. Moscow: Izdatel'skiy tsentr Akademiya
- [15] Krasilnikova, V. A. (2009). Theory and technology of computer training and testing. Moscow: Dom pedagogiki
- [16] Leong, K. E., & Alexander, N. N. (2014). College Students Attitude and Mathematics Achievement Using Web Based Homework. EURASIA Journal of Mathematics, Science and Technology Education, 10, 609-615
- [17] Lerner, P. S. (2005). The engineer of the third millennium. Moscow: Izdatel'skiy tsentr Akademiya
- [18] Martín-Gutiérrez, J., Mora, C. E., Añorbe-Díaz, B., & González-Marrero, A. (2017). Special Issue on Learning strategies in engineering education using Virtual and Augmented Reality Technologies. EURASIA Journal of Mathematics, Science and Technology Education, 13 (2), 469-486
- [19] Martynova, O. N. (2008). Potential of self-realization of future engineers. Samara: Izd-vo Samar, gos. aerokosm, un-ta
- [20] Mayyer, R. A. (2001). History of Mathematics: Course of lectures. Krasnoyarsk: RIO KSPU
- [21] Medvedeva, L. V. (2001). Theoretical and technological system of professionally directed education in natural science disciplines in a technical university. PhD Thesis. St. Petersburg: Russian State Pedagogical University. A.I. Herzen
- [22] Monakhov, D. N. (2013). Computer visualization as a means of forming the information culture of students. Voprosy gumanitarnykh nauk, 6(69), 127-129
- [23] Mushtayev, V. I. (2005). Fundamentals of engineering creativity. Moscow: Drofa
- [24] Naumkin, N. I., & Maykov E. V. (2006). Current state of engineering education in Russia: possible ways to improve it. Saransk: Izd-vo Mordov. Un-ta
- [25] Osipova, S. I. (2013). Designing by a student an individual educational path in the context of the informatization of education. Krasnoyarsk: Sib. Feder. Un-t
- [26] Pechnikov, A. N. (2014). Design and application of computer learning technologies. SPb.: Izd-voVVM
- [27] Pokholkov, Y. P. (2012). Approaches to the formation of the national doctrine of engineering education in Russia in the conditions of a new industrialization: problems, goals, challenges. Inzhenernoye obrazovaniye, 9, 5-11
- [28] Polat, E. S. (2008). New pedagogical and information technologies in the education system. Moscow: Izdatel'skiy tsentr Akademiya
- [29] Robert, I. V. (2010). Explanatory dictionary of terms of the conceptual apparatus of informatization of education. Moscow: BINOM. Laboratoriya znaniy
- [30] Sahin, A., & Adiguzel, T. (2014). Effective Teacher Qualities from International Mathematics, Science, and Computer Teachers' Perspectives. EURASIA Journal of Mathematics, Science and Technology Education, 10, 635-646
- [31] Selevko, G. K. (1998). Modern educational technologies. Moscow: Narodnoye obrazovaniye
- [32] Soldatkin V. I. (2002). Applied philosophy of open education. Moscow: RITS Al'fa MGOPU im. M.A. Sholokhova
- [33] Solovov, A. V. (2006). E-learning: problems, didactics, technology. Samara: Novaya tekhnika

- [34] Unt, I. E. (1990). Individualization and Differentiation of Learning. Moscow: Pedagogika
- [35] Urustemkhanova, A. S. (2013). Development of technological structures in the formation of linguocultural competence among students in a didactic information environment. KPZH, 3(98), 44-49
- [36] Yakovlev, A. I. (2001). Information and Communication Technologies in Education. Informatsionnoye obshchestvo. Vyp, 2, 32-37
- [37] Yeliseyev V. A. (2007). Theoretical bases of fundamental natural-scientific training of students of a technical college in the conditions of using information technologies. PhD Thesis. Yelets: Yelets State University named after I. A. Bunin
- [38] Zagitova, L. R. (2014). Mathematical training of future engineers in the universities of the oil profile on the basis of the competence approach. PhD Thesis. Kazan: Kazan State Pedagogical Institute
- [39] Zakharova, I. G. (2010). Information Technologies in Education. Moscow: Izdatel'skiy tsentr Akademiya
- [40] Zhichkina, A. Y. (1999). Socio-psychological aspects of communication on the Internet. Tyumen': TyumGNGU
- [41] Zhuykova, O. V. (2013). Organization of independent engineering and graphic training of undergraduate students. Integratsiya obrazovaniya, 2(71), 48-54