Formation of ecological competence of future engineers of mining profile on the basis of geoinformation technologies

Svitlana Hryshchenko

Head of Scientific and Technical Information Department
State Higher Educational Institution (SHEI) "Kryvyi Rih National University" Ukraine
E-mail: s-grischenko@ukr.net

Vladimir Morkun

Vice-Rector for research, Doctor of Science, Professor
Head of Computer Science, Automation and Control Systems department
State Higher Educational Institution "Kryvyi Rih National University", Ukraine

Abstract
The purpose of National strategy of development of education in Ukraine for the period till 2021 is renovation of content, forms, methods and means of education by widespread introduction of modern ICT and web content into educational-bringing-up process. And priority of education development is implementation of the modern ICT providing improvement of educational-bringing-up process, availability and efficiency of education, training of younger generation for activity in information society.
Therefore, modern technologies of education at the higher engineering school should be directed to training of the specialist with high level of professional competence, professional mobility and capability to lifelong training.
The solution of task of formation of ecological competence of mining profile engineer requires the reasonable selection of the means of ICT conducing formation of ecological competence. Today the use of ICT is particularly relevant when studying professionally directed disciplines by students of engineering specialties. Pressing task is constructive and research approach to preparation of future engineers to performance of professional duties in order to make them capable to develop engineering projects independently and exercise control competently.
Key words: MINING PROFILE ENGINEERS, ECOLOGICAL GEOINFORMATION TECHNOLOGIES, ECOLOGICAL COMPETENCE, PROFESSIONALLY DIRECTED DISCIPLINES, EDUCATIONAL-BRINGING-UP PROCESS

In Ukraine, mining profile engineers engaged at the enterprises of production of iron ore, ore of non-ferrous and rare metals, manganese and uranium ore, coal and other nonmetallic minerals are subjects of the Law of Ukraine "On increase in prestige value of miners' labor", according to which the state "conduces development of coal and mining industry and provides conditions for high-productive and safe work on the basis of mechanization and implementation of the advanced technology into production processes" [1]. Legal and organizational basis of mining profile engineers activity is determined by the Mining law of Ukraine [2], according to which state policy in the mining industry is based on the principles of increase in ecological safety of mining enterprises and providing personnel training of high qualification for mining industries.

The purpose of National strategy of development of education in Ukraine for the period till 2021 is renovation of content, forms, methods and means of education by widespread introduction of modern ICT and web content into educational-bringing-up process. And priority of education development is implementation of the modern ICT providing improvement of educational-bringing-up process, availability and efficiency of education, training of younger generation for activity in information society [3].

Therefore, modern technologies of education at the higher engineering school should be directed to training of the specialist with high level of professional competence, professional mobility and capability to lifelong training [6].

Various aspects of professional training of mining profile engineers are investigated by: N. M. Bidiuk, T. P. Medvedovska (comparative analysis of professional training), S. Ye. Blokhin, O. V. Derevianko (formation of professional competence), L. I. Zotova, O. F. Ivanov, O. O. Rusanova, L. M. Sadriieva, L. B. Shu-melchyk (training in the use of means of ICT), Yu. V. Baikovskyi, O. L. Herasymchuk, S. O. Zelinska, (pedagogical system of insurance of human safety, formation of ecological culture and competence).

Today the use of ICT is particularly relevant when studying professionally directed disciplines by students of engineering specialties. Pressing task is constructive and research approach to preparation of future engineers to performance of professional duties in order to make them capable to develop engineering projects independently and exercise control competently. It gives the opportunity to determine the following approaches to training of students of engineering specialties:

- formation of motivation and activation of cognitive activity in educational process;
- professional orientation of educational process;
- creative approach of teacher to management of educational process and formation of creative approach of students to training in subject-oriented computer environment;
- complex application of interactive methods and means in educational process;
- system control and evaluation of quality of training of future engineer during entire period of training.

The solution of task of formation of ecological competence of mining profile engineer requires the reasonable selection of the means of ICT conducing formation of ecological competence. Scale of works on evaluation of impact of mining on the environment considering specifics of natural climatic conditions has determined the choice of geoinformation technologies, namely, sets of "methods, means and technics used for collection, systematization, storage, processing, transfer, presentation of various messages and data" [4].

Use of means of geoinformation technologies in professional activity of mining profile engineer provides meeting of the main ecological requirements in the sphere of mining operations by means of geomodelling of arrangements of production divisions of mining enterprises, remote monitoring of use of ecologically safe mining technologies on the Earth surface, system analysis of multi-level and heterogeneous geoinformation in the course of implementation of advanced technologies of open mining operations, aerospace sensing of use of mineral waste for recycling, geoinformation mapping and so forth.

Use of ecological geoinformation technologies in forming of ecological competence of future mining engineers is a basis of optimum control of mining enterprises, and also the forecast and control of environment conditions. It also leads to rational economically and ecologically well balanced research of natural resources in mining districts. In this regard, the social importance of geoinformation technologies training of future mining profile engineers reflects the sustained ecological development, which is the component of concept of sustained development.

Therefore, it appears the necessity of solution of contradiction between:

- requirements to reorganization of training standards of specialists with higher education on the basis of competence-based approach and non-developed system of competence of future engineer of mining profile;
- public contract on training of competent specialists capable to provide sustained ecological development

of mining industry and non-developed complete system of formation of ecological competence of future engineer of mining profile;

- potential of geoinformation technologies in training of future engineers and non-developed technique of their use for formation of ecological competence of future engineer of mining profile.

References

1. Pro pidvyshchennia prestyzhnosti shakhtarskoi pratsi: Zakon Ukrainy No 345-VI [On increase in prestige value of miners' labor: Law of Ukraine No 345-VI]. (electronic resource). Verkhovna Rada of Ukraine. 02.09.2008. Available at: http://zakon0.rada.gov.ua/laws/show/345-17
2. Hirnychyi zakon Ukrainy: Zakon No 1127-XIV [Mining law of Ukraine: Law No1127-XIV]. (electronic resource). Verkhovna Rada of Ukraine. 06.10.1999. Available at: http://zakon0.rada.gov.ua/laws/show/1127-14
3. Pro Natsionalnu stratehiiu rozvytku osvity v Ukraini na period do 2021 roku: Ukaz Prezydenta Ukrainy No 344/2013 [National strategy of development of education in Ukraine for the period till 2021: Decree of the President of Ukraine No 344/2013]. (electronic resource). Verkhovna Rada of Ukraine. 25.06.2013. Available at: http://zakon4.rada.gov.ua/laws/show/344/2013.
4. Zhaldak M. I. (2013) Problemy informatyzatsii navchalnoho protsesu v serednikh i vyshchykh navchalnykh zakladakh [Problems of informational support of educational process in secondary and higher education]. *Kompiuter v shkoli ta simi* [Computer in school and family]. No3, p.p. 8-15.
5. Verkhovna Rada of Ukraine (2007) Pro osnovni zasady rozvytku informacijnogho suspiljstva v Ukrajini na 2007-2015 roky: Zakon Ukrajiny vid 09.01.2007 No 537-V. Verkhovna Rada Ukrajiny [On the Fundamentals of Information Society Development in Ukraine for 2007-2015: Law of Ukraine of 09.01.2007 No 537-V. Verkhovna Rada of Ukraine]. *Vidomosti Verkhovnoji Rady Ukrajiny* [Bulletin of Verkhovna Rada ща Ukraine]. No 12, p.p. 511.
6. Morkun V., Semerikov S., Hryshchenko S. (2014) Environmental competency of future mining engineers. *Metallurgical and Mining Industry*. No 4, p.p. 4–7. Available at: http://www.metaljournal.com.ua/assets/Journal/1.2014.pdf