Innovative technologies for developing professional capabilities of mining production specialists

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Abstract. The advanced training of mining production specialists is largely influenced by the development of motivation towards this process. Motivation is developed with the use of various forms and methods whereupon not only the employment period of mining production specialists but also their professional interests and needs are considered.

1. Introduction
High level of academic training provided to mining production specialists is one of the drivers of successful performance at today’s mining machinery manufacturing. A mining production specialist must be perfectly familiar with key concepts not only of his own discipline but also of the disciplines related to it and be aware of the latest achievements in these fields. Besides, a mining production specialist must possess adequate skills in research activities, be able to identify research goal and state research hypothesis, work with different sources of scientific information, design and set the experimental part of the research, conduct it, process the obtained findings, summarize and analyze them as well as find use for the obtained findings.

2. Materials and methods
An ascertaining and forming experiment was conducted among students of the Nosov Magnitogorsk State Technical University, with the participation of 67 students of the Institute of of additional education.

We selected the following main components of program and methodological support relating to academic training provided to mining production specialists:
- using interactive training methods (role playing, project activities, cases, training courses, etc.);
- organizing individual work in such a way as to develop skills and experience related to information search, teamwork, disciplined approach, etc.;
- certification of mining production specialists must be organized in such a way as to assess not only professional knowledge and skills related to the discipline but also basic skills and experience;
- supporting the learning process with teaching aids, computer programs and academic laboratories.

3. Results and Discussion
Being the constituents of this trend, personal needs and interests – in our case, these include advanced training and self-organization of a mining production specialist’s personality - acquire personal value for him through realizing his mission.
Interest - which represents the integrating motive - is perceived by the specialists as socially important first but acquires personal value during the process of realizing the necessity and the significance of advanced training, which gives rise to whole new needs.

It should be noted that the development of motivation for advanced training among mining production specialists will have a positive effect only if there is a combination between the formation of motivation and acquiring a system of knowledge and developing practical skills and experience.

Motivation encourages individuals to perform their job according to their delegated duties. To effectively motivate its employees the manager must be aware of their needs and motives that stimulate them to work and realize the ways to satisfy their needs to work – in our case, to advanced training of mining production specialists.

The challenge of realizing mining production specialists’ motivation towards advanced training involves the unsteadiness of motivation process and the non-obviousness of motives. It is often very difficult to determine what motives are effective since it is impossible to distinguish them in an explicit form. The challenge also involves the fact that the motivation process is unique for every person, motivation structures of different people are not similar and the degree of the effect that the same motives have on different people varies.

Following the above, we applied techniques in our study that stimulated the development of mining production specialists’ motivation towards advanced training based on the publications of Russian and foreign teachers and psychologists where the following topics were discussed:

- typology of teaching techniques (Y.K. Babansky, I.Y. Lerner et al.);
- managing and forms of academic influence on students’ learning and cognitive activities (K.B. Esipovich et al.);
- social-and-psychological training techniques (L.A. Petrovskaya, A.Y. Nayn et al.) [1].

When choosing the techniques applied in the development of motivation towards advanced training among mining production specialists we placed a particular focus on training techniques including gaming and discussion techniques.

Gaming techniques include the following stages: formation of game objectives, introduction of dual roles, generation of a role portrait, designing game rules, etc. Due to the fact that the attributes of discussion include being organized and orderly as well as team work on clarifying the validity of each matter brought up for discussion, the discussion techniques are mainly applied in the form of particular situation analysis. During the discussion course participants represent partners and coauthors in panel discussion and the formation of collective opinion. Discussion techniques include the following stages: proving, substantiation, denial, comparison, alternativeness, correlation, etc.

In addition, we applied the techniques of problem-based situation, particular situation analysis and so on in order to form motivation towards advanced training among mining production specialists.

When forming motivation towards self-education among mining production specialists we relied on the research conducted by S.P. Arhipova who attempted to identify personal motives that stimulated self-education activities among course participants [2]. The author highlights the following most critical motives: updating knowledge and determining its role in the improvement of a specialist’s socio-academic and educational practice, significance of self-education activities, self-esteem motives influencing the improvement of specialist status, self-fulfillment capabilities, involvement in creative activities and development of cognitive interests.

Despite the fact that self-education is personalized, it needs not only self-management but also management. The reason for this is that mining production specialists need to be taught how to feel familiar with new information flow and today’s technological, methodological and psychological problems and how to apply elements of self-educational activities [3,4]. As a result, great importance is attached to the development of a system of measures on forming self-education skills and experience (the ability to work with a book, the ability to keep records, draw plans, take notes and develop theses; using collected materials when writing reference papers, articles, reports and research papers as well as in the course of production and research activities).

We include the appraisal system used with mining production specialists in the tools for stimulating
self-education activities. Apart from the appraisal as such, this system involves the participation of mining production specialists in scientific and practical conferences, panel discussions and experience exchange conferences. All of the above focus mining production specialists on the development of creative approach in their professional activities and on advanced training.

The following methods are applied to determine the levels of mining production specialists’ preparedness for self-education activities: analysis of reference papers and education activity plans, consultations provided by more experienced specialists and scientists as well as getting familiar with advanced working practices. Obtained information allows to identify the level of theoretical knowledge and practical skills possessed by mining production specialists and their ability to use new technologies, methods and practical experience of other specialists in their work, draw summaries and conclusions as well as express one’s point of view regarding a particular issue.

When choosing the forms used to prepare mining production specialists for self-education activities preference is given to lectures. Lectures not only contribute to developing a knowledge system but also to getting course participants familiar with necessary literature, building up active interest in professional matters and, consequently, developing motivation towards one’s advanced training. When organizing lectures, selecting materials and choosing methods it is necessary to consider the employment period of mining production specialists, their professional experience and tendencies in self-education activities. Experienced mining production specialists require lectures of heuristic nature. Mining production specialists with professional experience who are involved in creative work are more receptive to lectures focused on exploratory methods of work whereas young specialists are more receptive to lectures of reproductive nature \[5,6\]. However, it should be noted that the classification of lectures into reproductive, heuristic and exploratory is fairly nominal apart from the lectures aimed at young specialists, for example. The above-listed elements can be found in each lecture where one of them will prevail.

Tutorials represent an equally important form used to prepare mining production specialists for self-education. They provide means for teaching course participants how to work with literature and stimulate the specialists to understand their weaknesses and strengths, discover the focus of their professional interests and develop the self-assessment of their professional skill level \[7,8,9\].

We refer to the following forms of activities related to the preparation of mining production specialists for self-education: training courses, disputes, panel discussions, conferences and practicums with the performance of independent work.

In addition to the above-listed forms of advanced training provided to mining production specialists, we also applied other group forms of activities. To establish effective performance when organizing group forms it is necessary to create an atmosphere of emotional support and tolerance, to provide course participants including young ones with an opportunity to express their opinion on subjects under discussion, to discuss potential challenges related to the application of novelities; to predict the reaction of the administrative office and to get mining production specialists familiar with the experience of those who already used such approaches.

4. Conclusion

Therefore, the advanced training of mining production specialists is largely influenced by the development of motivation towards this process. Motivation is developed with the use of various forms and methods whereupon not only the employment period of mining production specialists but also their professional interests and needs are considered.

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