

Pedagogical conditions of implementation the tools of situational modeling in professional preparation of future geologists

M. S. Kuzko

V. N. Karazin Kharkiv National University

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Abstract: It was considered the professional preparation of future geologists, and it was determined the essence of the concept "professional preparation of future geologists by tools of situational modeling". As a result the main pedagogical conditions for applying situational modeling in professional preparation of future geologists as motivational, organizational, methodological and technological were determined.

Keywords: *pedagogical conditions, situational modeling, professional preparation of future geologists, tools of situational modeling, cases, situational tasks.*

Introduction. Earth sciences occupy an important place in the list of natural sciences, which are not only the source of knowledge about the environment, but also have profound effect on technical progress and economic development of any country. Through their development the environmental management and exploitation of mineral resources become possible. For Ukraine mineral resources – are not just a sector of country's economy, but also they are the great and promising segment of economic activity that can ensure its economic sovereignty.

The strategic importance of the mining sector for the country and the potential of Ukrainian mineral complex determine the necessity to prepare specialists for this industry at a high level. The success of the future geologist as professional unit is provided by the readiness to professional activities, which consist of deep theoretical knowledge, practical skills and professionally important personal qualities. That is why professional preparation of future geologists should be directed to the full development of personality. We believe that solution of the outlined problem is possible if we change the approach to the selection of educational technologies and teaching methods, which are used in the professional preparation of future geologists.

Summary of publications. Having analyzed some methodological and scientific resources we found out that the system of geological education in Pedagogical University was studied by E. Nesterov, the process of specialist's professional preparation in mining and geological universities was studied by B. Guliy, L. Kiselevich, V. Manyuk, V. Mikhailov, N. Pavlun, A. Plotnikov etc.

Among the key issues of professional preparation of future geologists nowadays V. Guliy determines the imperfection of material and technical base of the educational process and the lack of interest of the government in searching the ways of its modernization [2]. Approaches to the process of development the standards of future geologist's professional preparation were summarized by N. Polyakova and V. Prikhodchenko, who emphasize the necessity to take into account in the future geologist's preparation the requests of the labor market and future employers [7]. Problems and prospects of geological preparation were considered by V. Mikhailov, who criticizes the current system of future geologist's preparation and emphasizes that the main problem of geological education in Ukraine connected with graduate's unemployment, caused by reductions of work places in Ukrainian geological industry. The researcher points out the urgency of finding ways to modernize the professional training of future geologists for preparing competitive specialists not only at Ukrainian, but also European and international labor markets, justifying this by increasing employers' requirements for quality of young professional's preparation [4].

Unfortunately the analysis revealed that the problem of modernization of the content of geological education, implementation of competence approach and modernization future geologist's professional preparation almost have not been explored in the works of local researchers for the past 10 years. Instead, the analysis of even one foreign periodical source "Proceedings of the higher educational institutions. Geology and Exploration" (Russia) for the same period revealed much greater interest of teachers and researchers to the problem of the modernization the process of future geologist's professional preparation.

That conclusion proves that the problem of the modernization the process of future geologist's professional preparation must be researched more observantly.

In our opinion the goal of future geologist's professional preparation is to make educational process more similar to the real work process, what can to prepare future specialist for his professional activity. It becomes possible because of implementation such interactive teaching method as situation modeling. So the analysis of the literature also allowed to define some contradictions:

- between the professional preparation of future geologists and insufficient development of theoretical and methodological foundations of their preparation;
- between existing potential possibilities of using situational modeling in professional preparation of future geologists and insufficient development of theoretical and methodological aspects of this process.

Purpose. Necessity of resolving identified contradictions determined the choice of research topic and the aim of article: to identify and to study pedagogical conditions of implementation the situational modeling in professional preparation of future geologists.

Materials and methods. While the process of writing this article literary sources on issues of the article have been studied, scientific approaches to the definition of "pedagogical conditions" were also analyzed, academic work plans and curriculums were researched, that allowed us to determine the specificity and characteristics of the future geologist's professional preparation. The totality of the operations allowed determining clearly pedagogical conditions of implementation of situational simulations in future geologist's professional preparation.

Results and discussion. First of all, let us give a bit of background information. Due to changes in the List of areas of knowledge and specialties, according to which there are two directions in the preparation of future geologists at bachelor level [5, 6]:

1. Direction 6.040103 - "Geology" (all applicants, who entered the university before 09.01.2016);
2. Specialty 103 - "Earth Sciences" (applicants, who entered the university after 09.01.2016).

So, when we say "future geologist", we mean the undergraduate student (who tries to get bachelor degree), who studies at the direction 6.040103 "Geology" or specialty 103 "Earth Sciences" (with specialization geology, hydrogeology, geophysics, geoinformatics, oil and gas geology, geochemistry mineralogy etc).

Mentioned above definition allows us to assert that professional preparation of future geologists is specifically organized process of future geologists preparation, which involves mastering their professional geological knowledge and the formation of skills and professionally important competencies, which is aimed to promote the most complete professional realization of the individual according to labor market's requirements.

Situational modeling as a pedagogical category was encountered in the works of S. Goncharov, A. Kashin, Yu. Kobayuk, N. Perhaylo, V. Perminov M. Rostocka, A. Shenderuk etc.

M. Rostocka defines it as a game and "a system of methods aimed not only to acquire competencies by getting knowledge and their memorization, but also to reproduction in the process of playing a real production situation" [8].

At the same time J. Sitka defines it as a kind of system and analytical activity, educational potential of which can be expressed in the possibility of simulating real situations, analyzing situation tasks with uncertain information for forming readiness for decision making of future professionals. The main advantage of situational modeling according to the explorer is not only high quality of learning process and practicing student's respective skills and abilities, but also the formation their preparedness for future careers [9].

The carried out research leads to the conclusion that situational modeling in the professional preparation of future geologists is a set of tools of interactive teaching method, which is designed for gaining knowledge and skills by future geologists, formation their competence, by the reproduction real and potentially real work situations, for their analysis, getting skills of decision making, forming attitudes for these situations. Situational modeling has a set of tools such as business games, simulation, role-games, case method, situation tasks, etc.

Pedagogical condition is a set of objective opportunities, circumstances and activities of the pedagogical process, which is the result of a targeted selection, design and using of elements of content, methods, and organizational forms of the training process for achieving educational goals [3].

Also, pedagogical conditions can be considered as circumstances in which the components of the educational process create a certain system, facilitating the fruitful cooperation of the teacher and student [1].

Thus, the pedagogical conditions of using situational modeling tools in professional training of future geologists – is a set of circumstances in which the educational process is the most efficient.

We grouped pedagogical conditions in 3 blocks according to their characteristic:

- motivational,
- organizational,
- methodological and technological.

The motivational block contains two directions: the motivation of the teacher to use the tools of situational modeling in the process of teaching and the motivation of the student to learn by means of situational modeling.

Teachers and students should have clear understanding of the reason why tools of situational modeling are possible in

future geologist's professional preparation and advantages of their using. The first pedagogical condition of this block is the justified using of the tools of situational modeling in the preparation of future geologists. That means that it is necessary to understand why, with what motive and what purpose these tools may be used for. And the first step in the implementation of these methods in the educational process is the analysis of disciplines within which they may be used, and the definition of the skills and competences which should be formed. Tools of situational modeling should be applied with the purpose of forming certain skills and competencies, updating professional knowledge. It is inadmissible to use situational modeling just for the sake of its using.

Now we are talking just about professional courses. Among geological courses we divide group of courses which can't be added by tools of situational modeling and group of courses which can. For example in studying of stratigraphy, general geology, tectonics, oil and gas geology, petrography, lithology it is not suitable to use cases and situational tasks, because these courses are basic and generally they are aimed to studying main geological laws and regularities. But it is suitable to use tools of situational modeling during studying ecological geology, geological prospecting, prospecting and exploration of minerals, conservation of mineral resources, historical geology, some topics of paleontology, etc.

For example during studying geological prospecting or prospecting and exploration of minerals you may use case study. It may be some work situation with problem students have to solve. During research we have used such tools. Students had been got the description of some rock mine and they had to propose fastening technology and material for it. During the studying of historical geology teacher may use such situational tasks as: to present to students the description of some territory in a certain geological period and students should to tell what kind of organisms can live in such environment and what kinds of minerals can be formed.

Organizational block includes preparation of the teacher to use tools of situational modeling, its detailed analysis. It is also necessary to prepare students to work using new tools: clearly explain the algorithm of work, consistency, its main points and "pitfalls". Before the beginning of work teacher must explain to students what they should do, the scenario and the rules of game (if it will be role or business game), the form of answer which they should present in the end of work etc. It is compulsory when it is the first time when teacher uses tools of situational modeling and it should be done each time when he uses it.

If students don't know or don't understand what they should do, how they should work on cases or situational tasks, they will feel confused, they will have negative motivation and they won't want to understand this material. If teacher doesn't know how to work with tools of situational modeling, how to organize work process and how to motivate and to interest students to work on cases and situational tasks, the effectiveness of educational process also won't be high.

Pedagogical conditions of methodological and technological block have special value. It is necessary to modernize the methodological support for the disciplines, to change the approach to the presentation of material and to conduction of practical exercises and classes. Situational modeling, represented by cases, business and role games, imitations, requires new methodological manuals, the creation of various graphic materials, writing game scripts and the contents of cases. Situational modeling (especially talking about case studies

and business games) as a method of teaching is most common in the training of students of humanitarian specialties, so it is necessary to adapt its tools to the specifics of future geologist's professional preparation.

It is also necessary to assess the availability of a technical base in an educational institution for the using of these tools, because the use of various modern technologies will only improve the process of professional training.

Conclusions. Effective use of situational modeling tools in the professional preparation of future geologists becomes possible only if a number of pedagogical conditions are followed. All pedagogical conditions according to their characteristic were grouped in three blocks. The first one – motivational – includes teacher's motivation to using tools of

situational modeling in the process of teaching geological courses and the student's motivation to learn by tools of situational modeling.

The second one – organizational – means preparation both members of educational process (teachers and students) to use tools of situational modeling. Because if this condition is not followed the effectiveness of educational process won't be high. The third one – methodological and technological – includes the development of manuals for using tools of situational modeling and different content for situational modeling, and it also includes the audit of technical resource base of institutes, which can used as the base for implementation of tools situational modeling in the process of future geologist's professional preparation.

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Педагогические условия внедрения средств ситуативного моделирования в профессиональную подготовку будущих геологов

М. С. Кузько

Аннотация: В статье рассмотрена профессиональная подготовка будущих геологов, определена сущность понятия "профессиональная подготовка будущих геологов средствами ситуативного моделирования". В результате были определены основные педагогические условия применения ситуативного моделирования в профессиональной подготовке будущих геологов как мотивационное, организационное, методологическое и технологическое.

Ключевые слова: педагогические условия, ситуативное моделирование, профессиональная подготовка будущих геологов, средства ситуативного моделирования, кейсы, ситуационные задачи.