SIMULATION AS A UNIVERSAL LEARNING ACTION

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Annotation. The article discusses the issues of teaching students modeling, which acts as a universal educational activity. Characteristics of modeling are given and the features of organizing students' modeling activities are described.

Key words: cognitive universal educational actions, sign-symbolic educational actions, modeling, primary general education, primary schoolchildren.

In educational practice today, the point of view is becoming increasingly widespread that the basis for successful learning is universal learning activities that take priority over subject knowledge, skills and abilities. The structure of cognitive universal educational actions includes, in addition to general pedagogical, logical, problem-solving actions, the development of sign-symbolic universal educational actions. The highest functional level of sign-symbolic means in various types of activities is modeling. At the same time, it is becoming an increasingly popular method of scientific research.

The purpose of the study is to study modeling as one of the ways to form sign-symbolic educational actions.

The research methods were: comparative and system analysis, generalization.

Sign-symbolic learning activities include skills such as encoding and decoding information, the ability to use visual models, drawings, charts, drawings, graphs and much more. An important indicator of the development of sign-symbolic universal educational actions is modeling. The use of modeling in the educational process allows you to move from visual-figurative thinking to abstract thinking. The systematic and purposeful use of various modeling methods in training cadets of higher military educational institutions begins at the initial stage of training , and is further developed and improved in the process of training in higher military educational institutions , ensuring the formation of generalizations among cadets .

The definition of the term “modeling” in the scientific literature is interpreted differently. So, K.E. Egorova, by modeling means “the construction of models for the purpose of studying them or obtaining new knowledge about objects” [2]. H.Zh. Ganeev defines: “modeling from the point of view of the needs of the cognitive process as the construction or selection and study of models in order to obtain new knowledge about objects” [1].

Having analyzed the definitions of modeling in the scientific literature, we can conclude that this is a method for recognizing the properties and qualities of an object that interest us using models, as well as acting with models, which allows us to explore individual qualities and properties of an object that are of interest to teachers and students.

Teachers and practitioners believe that the modeling method is most successfully used in the exact (natural) sciences, in particular in mathematics at the stage of problem solving.

The modeling process includes three elements: the subject (researcher), the object of research, the model that defines (reflects) the relationship between the cognizing subject and the cognizable object.

Modeling includes a clear separation of work steps in symbolic and real terms. Both material or materialized models and mental models can be used. Structural and functional genetic relationships at the entity level can serve as surrogates for modeling. Therefore, the model, as the central element of modeling activity, must necessarily capture and highlight the internal, essential connections of the replaced object, which are not amenable to direct observation. A model is a physical or abstract object whose properties are somewhat similar to the properties of the object being studied. In this case, the requirements for the model are determined by the problem being solved and the available means [4].

There are a number of general requirements for models:

1. Adequacy – a fairly accurate representation of the properties of an object;
2. Completeness – providing the recipient with all the necessary information about the object;
3. Flexibility – the ability to reproduce various situations over the entire range of changing conditions and parameters;
4. The complexity of development should be acceptable for the available time and software [6].

The requirements for the model are very different, but it is generally accepted that the model must, to one degree or another, correspond to the real object of study. There are two possible options for such a correspondence: isomorphic (when each element of the object corresponds to one of the elements of the model) and homomorphic (when there is no such detailed correspondence, but rather enlarged parts of the model - “blocks”, usually in the form of the shown formula). The main requirement for the model is that it must provide new information about the object under study.

There are several stages in modeling: selection (construction) of a model, work with the model and transition to reality [5].

The stages of mastering the modeling action by cadets consist of three stages:

The first stage is the replacement of the original with a model using symbolic actions. The expected result is the creation of a substitute image of a real object or phenomenon.

The second stage is coding. At this stage, a lot of work is done to transform, decipher, modify and complicate the model. The main content of this stage is the creation of a model of the original through sign-symbolic actions, consisting of:

- setting goals and motivating the work being done;
- preliminary analysis of educational material (updating knowledge - enhancing students’ experience) about the object or phenomenon under study (original);
- highlighting its essential features.

The third stage is devoted to decoding. Once this process is done and completed, the model should be closer to the original in content. Experts note that this step has not yet been sufficiently implemented in teaching practice. However, according to experts, it is quite possible to overcome this drawback through such techniques as the practical use of the model, taking into account the possibilities of practical use of the model to describe various objects and phenomena and using the technique of correlating the obtained modeling results with reality or by comparing the original with models as its substitutions [3].

Conclusion

Based on the foregoing, we can conclude that modeling, as a method of scientific cognition, is an effective and reliable means of scientific cognition of reality, since it allows one to abstract from unimportant, interfering features, focusing on the essential (essential) properties of an object. Thus, of the different types of activities with sign-symbolic means, modeling has the greatest application in teaching.

This method is recognized by teachers and psychologists as a very effective method for developing not only theoretical, but also, importantly, practical intelligence. In other words, we can say that modeling helps solve theoretical and practical problems.

References:

1.Ganeev, Kh. Zh. Theoretical foundations of developmental teaching in mathematics in secondary school: specialty 13.00.02 "Theory and methodology of teaching and education (by areas and levels of education)": dissertation for the degree of Doctor of Pedagogical Sciences / Ganeev Khamit Zhalilevich. – Ekaterinburg, 1997. – 327 p. – EDN NLLPHH.

2.Egorova, K. E. Modeling as a universal educational action / K. E. Egorova, V. A. Antokhina // Scientific works of Kaluga State University named after K.E. Tsiolkovsky: Materials of reports of psychological and pedagogical sections of the regional university scientific and practical conference, Kaluga, January 16 - 16, 2017. – Kaluga: FBGOU VPO "Kaluga State University named after K.E. Tsiolkovsky", 2017. – P. 33-37. – EDN ZBWZDD.

3.Zvorygina, O. I. Teaching argumentation as a means of forming a universal educational action of modeling / O. I. Zvorygina // Bulletin of the Surgut State Pedagogical University. – 2020. – No. 4(67). – pp. 31-35. – DOI 10.26105/SSPU.2020.39.95.008. – EDN MDYYAC.

4.Zelenskaya, O. Yu. Modeling as one of the ways to form universal educational actions in elementary school / O. Yu. Zelenskaya // Pedagogical Bulletin. – 2023. – No. 26. – P. 42-44. – EDN XPYCEO.

5.Fedorova, O. A. Modeling as a universal educational action / O. A. Fedorova // Primary school. – 2021. – No. 8. – P. 33-37. – EDN PIFVKQ.