

DESIGN OF THE SYSTEM OF GENETIC MATHEMATICS TEACHING AT UNIVERSITIES

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First, one should accomplish the analysis consisting of two stages: 1) genetic elaborating of a subject matter and 2) analyses of arrangement of a material and possibilities of using various ways of representation and effect on students. The genetic elaborating of a subject matter, in turn, consists of the analysis of the subject from four points of view: a) historical; b) logical; c) psychological; d) socio-cultural. In designing of the system of genetic teaching very important is to develop problem situations on the basis of historical and epistemological analysis of a theme.

The major aspect of logical organisation of an educational material consists in organising a material so that to reveal the necessity of the construction and development of concepts and ideas. It is necessary to arrange problem situations or tasks, for which the important concepts or ideas, which should be studied, would serve as the best solutions. It is necessary to analyse those problems of knowledge, for which the considered concepts and ideas serve as the necessary solutions. For this purpose, both historical analysis and epistemological considerations, and special search for appropriate problem situations and tasks can help.

When studying university algebra courses, the students usually are encountered with sequentially growing steps of abstraction - with a "ladder of abstractions".

According to the theory of A. N. Leontyev, actions on learning concepts, as well as any actions, consist of operations, which are almost unconscious or completely unconscious. These operations are essentially "contracted" actions with the concepts of the previous level of abstraction. As M. A. Kholodnaya (1997) noted, "a contraction is immediate reorganisation of the complete set of all available ... knowledge about the given concept and transformation of that set into a generalised cognitive structure".

In our view, for reaching a contraction of an action with algebraic objects into (automatic) intellectual operation it is necessary, after sufficient training with this action, to include it in another action, connected with the construction of objects of the next step of abstraction.

After two stages of analysis, it is necessary to implement the project of the process of study of an educational material. We divide the process of study into four stages: 1) Construction of a problem situation. 2) Statement of new naturally arising questions). 3) Logical organisation of an educational material. 4) Development of applications and algorithms.

References:

Kholodnaya, M. A. (1997). The Psychology of the Intelligence: Paradoxes of the Research. M. (In Russian).