



Original Contribution

TASKS AND SKILLS FOR SOLUTION THEREOF IN MATHEMATICS TRAINING, INFORMATICS, AND INFORMATIONAL TECHNOLOGIES

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ABSTRACT

The skills for task solution are developed and manifested though solving of tasks and are featured though it. They possess particularities, which differ for the various skills and many of them can be hardly identified. The results from our studies, directed unto tasks and skills for their solution from the school curriculum of mathematics can be systemized in the following trends: integration of situational approach for formation of skills and activity for solving of mathematics tasks; development and perfection of skills for solution of tasks in the sphere of informatics and informational technologies, necessary in personal as well as in general professional plan; the qualification form come to be appropriate models for formation of pedagogical skills through perceiving of the conception of D. Glissman and R. Pugg.

Key words: Tasks, Skills, Situational approach, Educational environment

INTRODUCTION

The process of tasks solution (broad sense) is subject of many sciences. The psychological and didactical studies the very notion of task is defined as subject of thought. The process of solution of tasks and thinking itself are very closely related. One of the most frequently met types of thought activity is the task solution. In a narrow scope of the sense thereof, many define intellect as skills and capacities for solution of tasks.

When the contents and the features of activity for task solution receive appropriate objectivity in verbal form, they are being preserved and thoroughly submitted to the next generations coming. That is why; every generation does its best to know it better, investigating the material and ideal subjects, related thereto, as well as the activities of the people, which master it.

The problem of skills acquired even more theoretical and practical significance within the conditions of contemporary development of society. The transition unto postindustrial

and informational society on global scale is featured by globalization of economy and capital, high mobility of labor and requires new type of competence in personal, professional and social sphere. The latter processes reflect particularly on training in mathematics, informatics and informational technologies.

The contemporary problematic of skills is a dynamically developing, with stable perspectives for future expansion of subjects of research and methods of study.

The world literature has accumulated vast experimental and theoretical material, which still does not outline the uniform theory for skills, which hardly can be possible at all. One of the perspective trends, of their study is the defining of skills through notion of situation (1) and the study thereof as complex integral formations, which form the fundament of knowledge activity of man (2).

The skills for task solution are developed and manifested though solving of tasks and are featured though it. They possess particularities, which differ for the various skills and many of them can be hardly identified. This sense therein the approaches, conditions and rules of their formation should not be universalized. They are preconditioned

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mainly by the skills for task solution. The purpose of this research is to work out theoretical - applied aspects of tasks and skills for their solving from subject area Mathematics, Informatics and Information technologies.

METHODS

Main approaches

Evristic - seeking, situational.

Theoretical analysis, modeling, and pedagogy experiment.

RESULTS

The results from our studies, directed unto tasks and skills for their solution from the school curriculum of mathematics can be systemized in the following trends, which presuppose overall realization thereof:

1. Integration of situational approach for formation of skills and activity for solving of mathematics tasks. The general cases are outlined (elements of new paradigm) and notional network. General approach for formation of skills for solution of tasks is developed from the school course in mathematics.

2. Coordination of developed models with models from methodic of training in mathematics. Aspects elaborated as: skills for solution of mathematics tasks and intellect development; skills in the structure of curriculum contents in mathematics.

3. Concretizing of the approach for formatting of skills in Geometry education on the stage of "formal operations" (12-13 year-old children)

4. Training in reflection unto decision searching;

Its predominantly practical and applied character features informatics and informational training. One of its main purposes is the establishment of adequate idea in the taught students for the contemporary informational reality and the related thereto capacities and restrictions of the various computer technologies. Under the conditions of global computerization, a considerable part of the daily human activities are connected with solving of problems and tasks, including various information. In regards of nature thereof, those are tasks for modeling of informational processes in a certain subject and the connections between them thought the

means for expression of applied program environment.

The role of tasks in the process of informatics and informational technologies training can be reviewed in the following directions:

1. Defining of problematic of informatics as science and as variety of activities, realized through informational technologies, though system of tasks, reflecting various sides of human life activity.

2. Assimilation on behalf of students of general methods and means for solution of school tasks in various trends of informatics and problems though informational technologies.

3. Design and description of studying activity as system of processes for tasks solution, which solution secures the mastering of required knowledge and skills in accordance with state standards.

The reviewing of tasks as object and as means in training, a tremendous importance for us has the qualification of teachers, in terms of methodology of training for the solution of studying and knowledge tasks in informatics and informational technologies. Our studies connected with development of theoretical and applied aspects of tasks and establishment of models for formation of skills for the solution thereof, are performed in the one year specializations in informatics and informational technologies with teachers, preparing to teach these school subjects. Quite appropriate comes to be the adaptation of situational theory for formation of skills, particularly in the section of nonverbal features (1). The results from these studies can be systemized in the following trends:

1. Development and perfection of skills for solution of tasks in the sphere of informatics and informational technologies, necessary in personal as well as in general professional plan.

2. Development and perfection of skills for composition of tasks for training in informatics and informational technologies, through studying of the general and specific particularities of tasks; though elaboration of methods for composition, based on the understanding of the separate elements in technology of solution: subject as complex of informational processes.

3. Informational model – applied program media – result and interrelations between them.

4. Establishment of school environment as organizationally and methodological and didactical system, including selection and structuring of studying curriculum contents, active methods of training, methodology and utilization of didactical materials, appropriate microclimate, preconditioning collaboration and team work, etc. The study environment which can serve as model for future teaching activity of students.

5. Elaboration and approbation of model for practicum in “Informational Technologies”, as fundamental environment for assimilation by the students of methods for task solution is based on:

- designing of system for school tasks for the realization of the purposes of training in various modules of studying school contents;
- designing of system of school tasks for adaptation of the theoretical core of concrete informational technology in connection with the purposes of training and achievement of state educational requirement for the school studying contents;
- designing of system of school tasks for formation of skills for usage of informational technologies during solution of problems as intellectual skills.

The “Informational Technologies” school discipline the tasks which are subject of solution are under the form of practical task, assignment and project

Course project – this is a performance of school studying project with the aim of completion of the course of education under certain module of subject “Informational Technologies”, connected with the specificity of training. The course project presupposes execution of individual creative work within group of students, where knowledge received for the whole period of training is being actualized under the certain given module or integration of several modules of subject “Informational Technologies”.

The realization thereof provides the opportunity for increase of knowledge activity of students and acquisition of concrete “professional” skills. The application on behalf of students of summarized knowledge and skills give the opportunity for wide transfer of knowledge and solution of various practical tasks.

The major purposes during elaboration of projects can be: development of critical way of thinking and knowledge skills; the planning and structuring of activity; seeking and utilization of information; decision taking through variety of activities; approaches and

instruments for solving of problem from various spheres and free experimental activity, directed and assisted by teacher.

Those tasks are realized through project oriented approach, which is one of the main in the process of training in informational technologies.

The students has right to realize also their own ideas for projects, based on their personal experience. This manner thereby they acquire active and creative role. During the process of project development, various types of activities are being performed, within the range from the ones included in the curriculum of studies and mastering of the set of instruments comes not be a self sufficient object, but is achieved within the context of concrete tasks.

Exemplary requirements for project assignment:

- the problem which shall be solved have to be defined, so that to allow its decision to be realized by means of studied programs, and requires as result the representation of a concrete final product;
 - in regards of its pre-conditions, there should not exist in clear appearance what program means are relevant for utilization, as well as the consequence of their implementation;
 - when assigning the problem, it is not obligatory to be defined the type of the final product. For example, if the solution of the problem is connected with performance of analysis, then the final product can be computer presentation, text documents or web site.
- The model criteria, by which a certain project can be assessed, are as follows:
- actuality and novelty of problem solved;
 - selection of the right strategy for solution of problem;
 - profoundness of knowledge applied;
 - punctuality and precision of task performance;
 - relevance of selection of means for presentation of information;
 - quality of the computer design of project;
 - volume of work performed, should correspond the time period determined for execution;
 - demonstration of skill for work in a team.

During project elaboration, practical knowledge and skills for work of the future specialist are manifested.

These requirements presuppose high activity, realized in conditions of solution of problematical and cognitive tasks and the realization of elements of research activity.

CONCLUSIONS

In conclusion one can state, that the qualification form comes to be appropriate models for formation of pedagogical skills through perceiving of the conception of Gleason and Pugh (3). The major presupposition for it is the heuristic side of activity for solution of mathematical tasks and complexity of processes for solution of tasks of training in informatics and informational technologies.

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