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Methodology Of Teaching Mathematics With Application Of Applied Problems And New Information Technologies

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ABSTRACT: Methodological recommendations for teachers have been developed to help develop mathematical thinking in students while solving applied tasks by using Mathcad mathematical environment. Consequently, the professional training of future young people should be structured in such a way that they are able to use software products of different purposes in their future activities. For this purpose, the whole training system should be based on the systematic application of new information technologies.

KEYWORDS: Method of teaching, modeling, applied problems, programming in Mathcad.

INTRODUCTION

In studies on methods of teaching mathematics [1, 2, etc.] the question of the need for explicit involvement in the school course of mathematics concepts "model", "modeling", the need to teach students mathematical modeling, developed a general methodological scheme for teaching the construction of mathematical models, defined the content of the basic concepts necessary to form ideas about mathematical modeling, it was noted that the reflection in the school course of mathematics elements of mathematical modeling way:

a) Improvement of applied orientation;

b) Formation of elements of mathematical culture and general culture;

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c) Assimilation of interdisciplinary links, etc.

d) Use of modern information technologies

THE MAIN FINDINGS AND RESULTS

The development of mathematics as a science has historically followed two paths: external and internal. The external way is associated with the need to solve problems that lie outside mathematics. In this sense the source of development of mathematics were the tasks of practical human activity (counting objects, measuring areas and volumes, tasks of economics, technology, etc.). The second way is internal, arising from the necessity of systematization of found mathematical facts, generalization of them into theory, development of this theory according to its internal laws. This is what led at one time to the separation of mathematics as a science from the system of scientific knowledge of humanity. The two above-mentioned ways of development are called applied and theoretical.

Applied mathematics can be characterized as a science of optimal solutions of mathematical problems arising outside mathematics. Accordingly, the applied problem is a problem posed outside mathematics and solved by mathematical means. The majority of authors of researches allocate 3 stages in the decision of an applied problem:

1) Formalization, i.e. translation of the proposed problem from natural language to the language of mathematical terms. This stage is usually called the construction of a mathematical model of the problem;
2) Solving the problem within the model;
3) Interpretation of the result obtained, i.e. translation of the result obtained (mathematical solution) into the language in which the original problem was formulated.

The first stage is the most difficult for students. The reason for these difficulties is that the translation of the problem from natural language to mathematical language requires a high level of abstract ability, which is associated with the formation and development of mathematical thinking. Abstraction from the real object, its properties and transition to a mathematical object is a complex operation, so the ability to translate the problem from natural language to mathematical should be given paramount attention.

We consider mathematical modeling as the most important means of solving applied tasks. It has been stated [3, p. 8] that the mathematics problems in textbooks and manuals do not fully contribute to the development of cognitive interests of students, because they

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represent ready-made mathematical models and do not make students think and look for ways of the optimal solution of the problem. A similar opinion is expressed by L.G.Peterson [4, p.31]: "The applied orientation of the course, even in its internal aspect, is clearly insufficient, due to which students do not see the links of the studied and usually very difficult for them subject with the tasks arising in their personal practice, in the practice of society and any particular person. This explains to some extent the popular opinion that mathematics is dry, boring, disconnected from life and that its study at school is no more than a necessary evil.

In the existing school practice, the first and third stages of modeling are almost completely omitted, considering that the task of the school mathematics course is only to study mathematical theories and to solve problems, the main purpose of which is to reinforce knowledge of these theories.

Many studies (R.A. Meyer and others) emphasize that in the applied problems in school textbooks and manuals pupils have to build a model and investigate it, and, finally, to interpret it themselves. This requires a lot of effort and time on the part of the student, and as a result, such problems are almost never solved at school.

As already noted, the most difficult stage for students is the first stage of creating a mathematical model. The development of skills in constructing a mathematical model should be carried out throughout the course of algebra, beginnings of analysis, etc., rather than being concentrated in some specific topics of these courses. The tasks themselves should maximally use the experience of students, their keen interest in the phenomena of nature, inclination to observe. In school we often have to solve problems leading to dynamic models, i.e., models that are constantly being updated, updated depending on variation of parameters of the simulated phenomenon.

CONCLUSION

Among the currently available various software products for informatization of the learning process of higher mathematics the most suitable are computer mathematical systems - integrated software products that can perform all kinds of calculations (numerical, symbolic, graphic) and have built-in high-level programming languages (that is available to the user). We used Mathcad to solve applied problems, creating an individual task for each student. We received results of 95% activity in students. Application of Mathcad system in educational process at school will provide continuity of its application in applied tasks, as schoolboy,

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accustomed to use Mathcad system in his studies, will be morally and practically ready to use it in solution of his applied tasks [5,p.25].

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