TEACHING MATHEMATICS IS A COMPLEX AND DEMANDING PROCESS

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Summary.
The article describes science in various segments of math teaching starting with the nature of math to mathematical tasks as an important method in shaping the system of basic mathematical knowledge, abilities and habits in students. In the end, some drawbacks in math teaching are mentioned which occur due to the inappropriate treatment of science in the teaching process.
Key words: math, teaching math, scientific approach, the science principle,
mathematical concept, theorem, problem – task.

Introduction

Today, as a result of the emergence of a new scientific direction in the field of pedagogy - the idea of pedagogical innovation and renewal of the educational process, a new direction in the pedagogical activity of teachers - the concept of "innovative activity of the teacher". Analyzing the concept of "innovative activity", G.A. Mkrtchyan's opinion is noteworthy - "There are 3 main forms of pedagogical experimental activity: private experience, experimental work, innovative activity of the teacher. The more innovations in pedagogical activity, the better the teacher understands the private experiment.

Modern math teaching methodology offers various possibilities for solving the problem of involving students in independent and research work, it develops their problem solving skills and develops their creative thinking processes and skills. One of those possibilities is in the area of scientific framework. The foundation of a scientific framework is the principle of science and scientific research methods.

Teaching mathematics today primarily takes place within a professional framework. However, teaching math is a complex and demanding process. Even though being professional is a condition for its success, it is not sufficient. The complexity is successfully resolved by relating math to other sciences. That way we get a process which has to take place harmoniously within several frameworks. The main frameworks are language frameworks, professional frameworks, methodology frameworks, scientific frameworks, pedagogical frameworks and psychological frameworks.

As it is not easy to achieve harmony, occasional slips and weaknesses occur in math teaching which significantly influence the quality of math education. That reflects negatively on the aims of modern math teaching which emphasizes involvement of students in independent and

research work, developing skills for problem solving and the development of creative thinking and creative skills [1].

Modern math teaching methodology offers various possibilities for solving the above mentioned problem. A teacher can find many possibilities within the scientific frameworks. The foundation of scientific frameworks is the science principle and scientific research methods. These concepts often cause a dilemma. What does a scientific approach mean in math teaching? The aim of this article is to describe that meaning and to give a few postulates and issues, which arise in scientific frameworks of teaching mathematics. A mathematics teacher does not have to be a scientist in order to appropriately and correctly apply the science principle and research methods in math teaching.

Teaching mathematics

From the comparison mentioned, we can easily conclude that scientific methods are important for modern math teaching. That is why they are the subject of research in modern mathematics teaching methodology. Through the selection of appropriate problems and through the application of that method a creative teacher can prepare students for work, which is very similar to research work, work of a scientist. Plenty of math teaching content can undergo such application thus meeting the science principle in its extent [2].

Students' failures in mathematics and the inadequate knowledge which is displays upon the completion of their education are for the majority part a consequence of the fact that teaching is mostly done at a lower level, where acquisition of content is overemphasized, while the higher level is neglected. The reason for this neglect lies in the fact that for higher level math teaching one needs more demanding scientific methods based on teaching which is heuristic and problem solving. On the other hand, the need for (appropriate) use of scientific methods in mathematics teaching can be explained with the facts.

Developing mathematics is a concrete and inductive science, and mathematics itself is an abstract and deductive science.

At times, the science principle is realized in agreement about the meaning of a particular concept, the size or object and the explanation why the agreement is introduced. For example, the following questions can cause initial not understanding and dilemmas: Is number 1 a cardinal number or not? What is the point of an empty set? How much is a^0 ?

An empty set $\emptyset$ is a set which consists of no elements. This meaning of an empty set would not have much sense if there was no serious scientific argument for it. We find it in the operation set cross section. The demand that cross A∩B of any two sets A and B is a set, and that means a cross section of disjunctive sets, leads to the need for introducing the concept empty set.

$a^0 = 1$. This equivalence is introduced without explanation. And the explanation is simple. It stems from the rule for dividing the exponent of equal bases: $a^m : a^n = a^{m-n}$ (m > n). For m = n the left side of the equivalence is equal to 1, and the right side a^0 . In order for the rule to be valid and in that case, the agreement is that $a^0 = 1$.

Theorems and proofs

What a theorem is we know. A theorem is a mathematical judgment whose truth is established by proof. A theorem is one of the most important mathematical concepts and its analysis demands special attention of every mathematics teacher. Appropriate teaching of that concept enables faster development of mathematical thinking of a student and better understanding of mathematics itself.

In teaching a theorem the teacher realizes the science principle if he teaches his students to appropriately and precisely formulate a theorem, clearly differentiate assumptions from a theorem statement, formulate a theorem twist, formulate an opposite statement, and if he achieves understanding of the methodology in proving a theorem. Indirect theorem proofs, especially forms such as proof of contraposition and contradiction create great difficulties for students [2, 3].

The question posed here is: should a student who will not deal with mathematics in everyday life at a later stage in life, or for whom mathematics will not be of essential importance, know and understand these theorems? The answer can be portended from the following irrefutable truth: learning how to prove means learning how to judge (reason), and that is one of the basic tasks in teaching math. Every person should know how to judge (reason) in life. How else can two different statements be compared, or extract from several statements those that are true, check the correctness of a suspicious proof, disprove someone's opinion, come to the appropriate conclusion about something, etc.? Yes, every student should learn how to prove. That is why education is not complete if a student throughout schooling has not encountered and understood proof for several standard mathematical theorems.

A critical part for carrying out generalizations through inductive sequences of concrete cases is the transfer to the level where the abstraction procedure begins, since the transfer from concrete to abstract is even at this point quite difficult for some students [3].

In the case of theorems the use of words, writing or symbols is important. Accordingly the link between the first, second and third can be read in the following axiom for the polygon surface:

If polygons P_1 and P_2 are congruent, then numbers p(P_1) and p(P_2) are equal, that is, the following implication applies $P_1 \cong P_2 \Rightarrow p(P_1) = p(P_2)$

Conclusion

We have already mentioned that a math teacher need not be a scientist in order to appropriately and adequately apply the science principle and scientific methods in teaching. This occurs in math teaching without much interference. Solving a math problem implies some research and development. That is why the teacher has to create the spirit of curiosity in his students, the inclination for independent mental work and to show them ways to new discoveries. A creative mathematics teacher using creative teaching methods has great chances to develop in his students creative characteristics.

References:

1.M.K. Akinsola, F.B. Olowojaiye, Teacher instructional methods and student attitudes towards mathematics International Electronic Journal of Mathematics Education, 3 (1). 2008.

2.KURNIK. Z., The scientific framework of teaching mathematics, U M. Pavleković. 2007.

3.KURNIK. Z., Konkretizacija, Matematika i škola,Vol.8, n39. 2007.