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Mathematical Research and National Education

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MATHEMATICAL RESEARCH AND NATIONAL EDUCATION

In our days we focus strongly on the interrelation between research and production. Between these two fields there is actually a very tight relation (osmosis), a dialectical union, while each is maintaining its own identity.

Education has been developed in accordance to its needs and demands resulting from the technical and scientific revolution: the introduction of faculties in the fields of production, research and design areas, and vice versa, the necessity of introducing the process of production and research work in the school units.

Therefore, it should be emphasized, that the students' dissertation projects be immediately applied in the production process. In this case, it is the school's responsibility to train and shape the future specialists in all fields of activity.

In the light of the present reality, we are witnessing an informational burst in all domains, and we notice the sustained effort which is being made by the educational system to adapt itself to the over increasing exigencies of the society, to keep the pace with the techniques and science conquests. Within these science conquests, mathematics occupies a central place – "the queen of sciences", as Gauss has said.

The Mathematics, for those who are studying it, confess to them, by the precision of the formulae and expressions on epoch, that there have been developed much, such a way that it was transformed from a science of numbers and of quantities (as it was called in ancient times), in a science of essential structures. New branches of mathematics have appeared, many of them due to its interpenetration with other sciences, and even branches such as: Mathematical Linguistics, Mathematical Poetics (in the latter a remarkable contribution is due to Prof. Solomon Marcus from Bucharest University). (The Mathematical Linguistics having as a starting point the topic models of the natural language and developing on algebraic grammar, by which are being studied the phenomenon of the natural languages).

"(…) mathematics have no limits, and the space that it finds is, so far, too reduced for its aspirations. The possibilities in Mathematics are as unlimited as the ones of the worlds which ceaselessly grow and multiply under the scrutinizing gaze of the astronomers; the mathematics could not be reduced by limited, precise keys or to be reduced to valid definitions eternally, but as the conscience life, which seem dormant in every world, each stone, each leaf, each bloom of flower, and in each which it is permanently ready to burst in new forms of animal life and vegetal existence" (James – Joseoh Sylvester, English Mathematician).

Mathematics in other sciences.

We say that is about their mathematization. All these sciences could not progress if they were not mathematized. Therefore, a whole group of discoveries wouldn't have taken place had it not been for the knowledge of certain scientific procedures, if

mathematics had not possessed a certain quantity of knowledge (i.e., Einstein would not have discovered the theory of relativity and if before him the Tensorial Calculus would not have been discovered). Although other discoveries have been made before using math's calculations, which afterwards experimentally have been proved (The physician Maxwell – has generalized the concept of the field of electromagnetic forces, emphasizing the fact that even reforming to an electric or magnetic field this is propagated in existence by waves with the speed of light.).

Mathematics also offers its possibilities to the technical field, solving problems arising in the production process.

The very high abstractness in Mathematics does not hinder under its immediate applicability in practical manner, therefore would be worthwhile mentioning a few examples:

- The Romanian Geometer Gh. Țițeica made discoveries in the field of differential geometry- which led twenty years later to the conclusion that these could be applied in the theory of generalized relativity;

- Cayley has discovered the notion of matrix, discovery which found its applicability eighty seven years later when Heisenberg used it in the quantum mechanics;

- The English Mathematician George Boole, by the middle of XIX century, discovered the algebra which carries his name and which occupies the worthy place in the software – electronic computers.

An interesting correlation exists between mathematics and arts: music, painting, sculpture, architecture, and poetry.

Art is the pure expression of the "sentiment" while Mathematics is the crystalline expression of the pure "reasoning". Art, gushing from a sentiment, is warmer and more human, while mathematics, springing out from reasoning, is colder, but glitters more. An interesting correlation between Arts (and Literature especially), has been made by Solomon Marcus, Professor in the Department of Mathematics and of Languages also, showing the superiority of the pure artistic language vis-à-vis of the scientific language.

While the scientific language has a unique sense, the literary one has infinites. Therefore, in science the ambiguous language is eliminated. Recalling "this luminous point where geometry meets the poetry" as the mathematician and poet Dan Barbilian was saying, and we are reminded also the following idea:

"The poem of the future, by excellence, the sublime poem, will be borrowed from science" (Piere-Jules-Cesar Jensen).

Generally speaking about research, the risks that the scientist might run should be mentioned:

- he may find results already known (this shouldn't represent a disillusion, but even satisfaction);

- there could be a lead to suggestive results (one should have patience, and persevere);

- one could have errors in his demonstrations (deductions) – (almost all mathematicians have committed errors).