

ASPECTS REGARDING THE LEVEL OF PERFORMANCE IN MATHEMATICS

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Abstract: *In the present paper addressing the issue of advanced performance in mathematics, we seek to answer to the following study questions: “What are the main factors that lead to the achievement of advanced performance?”; “Which is the profile of the teacher able to train the Olympic students in Mathematics?”; “Why do teachers want for their students to achieve advanced performance in mathematics?”; “Why do the students want to reach a high degree of performance in Mathematics?”; “What difficulties could significantly impede on student progress?”; “What is the connection between enthusiasm and advanced performance in Mathematics?”; “Why does an Olympic student participate in competitions?”.*

Keywords: *advanced performance, students, profile of the Olympic students’ teacher in Mathematics.*

1. INTRODUCTION

National education, achieved primarily through the education system, is one of the main levers of the development of the Romanian society. The current educational system in our country is the result of the creative valorization of the valuable traditions that have crystallized over a long historical evolution.

An important aspect of the educational process is its efficiency, which takes the form of school success or failure.

Performance in Mathematics is an old, but always present problem for students, teachers, as well as for parents.

In the performances of the students you can see the work of the teachers as well as the students, the material resources available to them, as well as the way in which the class is managed, giving the students an optimal environment for learning. By participating in competitions, these performances are made known and improved.

In the present paper, according to Ş. Mircea, we agree that “performance is an exceptional achievement that exceeds the level customarily achieved.”[1]

Many authors study the possible factors for teachers to obtain with their students performance in Mathematics.

“Recent studies point to a positive correlation between student attitudes towards mathematics and student academic achievement.”[2]

E.M. Anderman, J.S. Eccles, K.S. Yoon, R. Roeser, A. Wigfield, and P. Blumenfeld, affirm that:” the student level, positive changes in students' achievement values in mathematics were associated positively with self-concept of ability and the previous year's achievement values. Students experienced decrements in achievement values, after controlling for other student and classroom-level variables, in classrooms where performance-oriented instructional practices were used.”[3]

There is an essential goal for educators to identify internal mechanisms which would determine a student to obtain performance in Mathematics. K.R.Wenzel and A. Wigfield consider that “students' social motivation, and their relations with teachers and peers, strongly influence their academic performance and general adjustment to school.”[4]

T.Williams and K.Williams give another perspective about performance:”studies of the relationship between self-beliefs and performance tend to draw on this or related theories and usually endorse the notion of reciprocal determinism at a substantive–theoretical level. However, attempts to model this postulated mutual influence of self-beliefs and performance are few and are focused on the relationship between self-concept and performance. The reciprocal determinism of self-efficacy and performance seems to be without direct empirical support, probably because the longitudinal, repeated-measures data often considered necessary for this purpose are not available. It is possible, though, to model reciprocal effects with cross-sectional data.”[5]

Also, according to W. Lee, M.-J. Lee, M. Bong, “Individual interest, as an affective motivational variable, could predict academic self-regulation and achievement, above and beyond what academic self-efficacy predicted. Academic self-regulation could be encouraged through the promotion of two distinct motivational sources, academic self-efficacy and individual interest.”[6]

But where does the self-efficacy perception come from? Some objective measurements of a students' self-efficacy in mathematics could consist in his/her achievements at several competition, the attitude of the teachers, parents or classmates concerning his mathematical capabilities. The internal motivation which determines a student to make an effort to obtain mathematical achievements could be the passion for this subject or the desire to be a winner.

2. TEACHER-RELATED FACTORS

In the following we present some factors for teachers to obtain with their students performance in Mathematics.

The main factors that lead to the achievement of the performance are: logical thinking of students, sustained work, a special timetable at school, the results of competitions, parents' support and a good students' motivation in every possible ways: prestige of the school, with rewards, position in class, etc. In other words, the attitude of the students and their parents towards the school, the intellectual endowment doubled by the motivation for carrying out a sustained work, determination, perseverance and resistance to the intellectual effort of teachers and students alike, lead to obtaining very good results.

Other important factors that help teachers to obtain with their students good performance in Mathematics competitions are: the teacher-student relationship, the teacher should arouse students' interest and curiosity, respect their age particularities.

The teacher's grace and passion for Mathematics, the diversification of the teaching-learning methods, will also help to achieve performance. The teacher should work differentiated in class and in mathematics circles, use different problems, with increasing difficulty. Differentiated treatment of students at lessons, can be achieved both in the teaching and learning process, as well as in their evaluation. The teacher who has Olympic students should always create in the classroom a stimulating competition in solving difficult and beautiful problems, should appreciate and stimulate students who give outstanding answers, he should teach the students how to learn, he also should attract students to participate in performance centers, etc. At the same time, the teacher should create in the school a climate of assessing student performance, encourage students to constantly performance work and to achieving success.

The teacher's availability, that is, the time and patience involved in this activity, is also an important factor.

Another factor is the teacher's permanent concern to form the mathematical thinking of the students. The mathematical thinking at school level, the one that underlies the achievement of the performance, according to H. Banea, "is manifested by the fact that the student is good at mathematics, in all respects, that is, he understands quickly, retains easily, reproduces the learned theorems, solves the vast majority alone of the problems that are proposed and has the initiative of study and creative." [7]

The teacher has the task of following the components listed above and then educate them aware. Thus, the students' understanding is reflected after H. Banea by: "equivalent forms or formulations for some accumulated knowledge, counterexamples for known notions, examples for new notions." [7]

In order to identify the students' knowledge, the same author suggests the teachers to establish: their extent (quantity, number of definitions, properties, theorems from a given topic), their depth (strings of implications made up of lemmas, theorems, corollaries, applications, generalizations, particular cases) and the quality of knowledge (associations caused by a notion, theorem, method.) [7]

The application can be tracked by the teacher by: "calculation technique, mathematical technique (typical reasoning, general methods, typical procedures), combined applications (from different chapters or branches, special methods, artifices)." [7]

According to the same author, the teacher can identify the special abilities of the students: "the ability to analyze and generalize (research of incorrect problems, with contradictory, additional, insufficient data, discussion of particular cases, generalization), imagination (realization of problems on a given topic), creativity (creating problems with a higher degree of originality, without an explicit order; or notes and articles)." [7]

H.Banea shows that: "mathematical thinking is about both qualities that can be developed, but also information. We do not see how thinking could manifest in the absence of a material to be practiced because not all problems or questions would concern only insight. (meaning that it would not require much knowledge). On the contrary, the presence of some knowledge facilitates the creation of associations, generalizations or may even be the foundation of the creative activities." [7]

The existence of a total compatibility between the effort made by the teacher and his / her desire to obtain the performance with his students, is another factor that facilitates the achievement of the performance.

A final factor puts emphasis on the fact that teachers have to look for passionate, hardworking and logical thinking students for obtaining performance in mathematics.

3. THE PROFILE OF THE OLYMPIC STUDENT'S TEACHER

Any teacher who would like to achieve with his students performance in Mathematics should demonstrate that he is patient, persistent, ambitious, passionate about mathematics, motivated to achieve performance in mathematics, should demonstrate that he has solid, and rich knowledge of mathematics and applies various differentiated training strategies in his lessons. He should also demonstrate that he has a strong desire to help students achieve at competitions, is rigorous and serious in his work in the classroom, resistant to stress and interested in everything related to preparing its students participate in competitions: he must give immediate answers and indications to the questions of the Olympic students, provide them with consultations whenever necessary.

Seeing that a student can and wants to make extra effort in mathematics, the teacher teaches them knowledge in addition to the school syllabus, recommends the additional bibliography necessary for the preparation and helps in deciphering mathematical texts, he should also organize in school a mathematical circle, stimulate the students to participate in school competitions, send problems solved to the Mathematical Gazette, stimulate competition in the classroom, teach the Olympic student how to learn and indicate bibliographic sources, that is recommend them suitable auxiliaries and solve difficult problems in the classroom.

The teacher who has Olympic students should always show seriousness and rigor in teaching mathematical notions, he must teach correctly. He should approach the teaching of mathematics in the classroom taking into account the different learning styles of its students.

The teacher who has Olympic students should also have other qualities, including: love for the teaching profession, flexibility and empathy towards the students, the permanent desire for self-improvement, he should increase, in need, the degree of involvement in his didactic activity, the love and respect that he has over his own students.

The teacher who has Olympic students should make his students to say the same with C.F. Gauss: "Mathematics is the queen of science!"

There are certainly many other features that complete the profile of the teacher of the olympic students in mathematics but they are closely dependent on the situation in the classroom, on the specifics of the contest, and on the talent of the teacher.

4. CONCLUSIONS

Instead of conclusions, in the following, we will answer a few questions.

1. In order to answer to the question: "Why does the teacher want his or her students to achieve advanced performance?", here are some ideas.

a. The teacher of an Olympic student wants to share the knowledge he has and to raise the level of the students in the field, he wants to be useful to the students.

b. By discovering students with potential in mathematics, the teacher wants to help them to confirm their passion for this difficult subject.

c. He wants to make the student work to achieve the performance so that in the future he has a profession in which he also performs, that is, the student learns to do things well, a habit that he will have all his life.

d. The teacher wants to achieve with his students performance in mathematics in order to have the satisfaction of the work done, the spiritual gratitude for guiding the student to success, from a passion for mathematics.

2. The answer to the question: Why do the students want the performance in mathematics? is given below.

a. Students would like to achieve mathematics performance in order to have the satisfaction of their efforts.

b. Students would like to achieve mathematics performance due to their extrinsic motivation: winning, prize, awareness of the importance of mathematics, passion for mathematics, for the obtained reputation, admiration, to bring satisfaction to parents.

3. As for the question: Who deals in the way of this performance activity?, the answer is:

a. persevering and successful students,

b. students who like competition,

c. students who have a solid knowledge base in the field,

- d.students who are passionate about what they do,
- e.students who are well motivated and not least,
- f.students who are preparing intensely.

4.Regarding the question:What difficulties could return the student from the ascension to performance? a point of view is given below. Difficulties may be:

- a.increased difficulty of the problems,
- b.lack of motivation and support from both parents and teachers,
- c. not to appreciate the work of the student,
- d.insufficient involvement,
- e.lack of time needed for additional training,
- f.lack of understanding of theoretical explanations or problem solving,
- g.specific health problems or certain problems that intervene in the family and will not allow the student to focus, think,
- h.the group of friends who will pull him down, or involve him in other activities, or convince him not to prepare for Math performance.

5. Another question is: What is the connection between passion and performance in Mathematics?

If we want to determine the connection between passion and performance in Mathematics, we could say on one hand that passion facilitates the performance, and on the other hand, that performance increases, supports passion.

Passion for mathematics is closely related to motivation, ambition, perseverance, to “a bit of madness”, renunciation other activities, even sacrifice, desire to be good, the desire to surpass and many other connections.

Performance is closely linked to additional training, to the hereditary dowry, to previous results, to hard work, experimentation and sometimes why not to chance.

6. For the question: Why a student would like to do performance in Mathematics? some arguments are given below.

If we wondered why a student would like to do performance in Mathematics, we could find more answers:

- a.out of passion for this queen of science, as Gauss asserted,
- b.out of a desire to know as much about mathematics as possible,
- c.to have a top perspective on the subject in the classroom,
- d.to be convinced that it is doing something useful for its future,
- e.to get good results in competitions,to be safe in exams,
- f.to be able to reach a profession in line with passion,
- g.to reach the best student.

7. A last question: Why an Olympic student participates in competitions?

An Olympic student participates in competitions for several reasons:

- a.from the desire to win,
- b.to realize what level he has,
- c.from passion,
- d.from ambition,
- e.to training,
- f.to reward the prize offered by the organizers, etc.

In conclusion, the teacher who has Olympic students is the one who shapes personalities and builds characters. Therefore, he is a major factor that influences the school success and further the life of each student.

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