



New and Innovative Approaches in the Process of Teaching Mathematics

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Abstract: *The aim of this publication is not only to present and depict active methods, but also to confirm that they encourage contemporary students to work in class, acquires knowledge and skills that are necessary in life. Moreover, the analysis should encourage the teachers to include new and innovative approaches in the process of teaching mathematics and to foster the students to take an active part in the realization of the teaching process, according to the main motto of the project.*

Keywords: *teaching math, scientific approach, skills of mathematics, mathematical concept, teaching methodology, cognitive structures.*

Introduction

A teaching method is a way in which a teacher organizes and manages the teaching learning situation, presents clear explanations and vivid descriptions, assigns and checks if learning interacts effectively with learners through questions and probes, answers and reactions, and praise and criticism. According to Carl, a teaching method is a way of facilitating interaction between the teacher and learners in order to realize set goals. Learning that is motivating therefore should be:

- An active process in which the learner is maximally involved;
- Guided through the use of a variety of teaching methods, which in the end offer learners a variety of learning experiences, that will enable them later to generalize and discriminate information.

In order to motivate learners Scot posited that learner-centered teaching methods should be used to ensure that:

- ✓ There is a close link between the learning needs of the learner and the teacher's teaching;
- ✓ Feedback is given in phases so that the learner feels that his/her hard work is being recognized and rewarded by the teacher;
- ✓ All learners are challenged and extended in their learning;
- ✓ Whatever is being taught is directly linked to the learners' real life experiences.

According to these, we want to develop the new teaching methodology and use it to the students to like Mathematics and learn more. Using debate on mathematical problems and ICT methodology for learning will lead to enlarge students' skills of mathematics and their abilities to solve practical and word problems. Students will be an active part of educational process using this new methodology. Students gained knowledge and skills in mathematics can be applied in other areas of science. Thought MATHDebate method also literacy and communication skills are developed [1].



A project of this kind is an excellent opportunity for making arguments between minds, criticizing different opinions on some topic, all of it with one goal: achieving very good mathematical skills of the students. At the end, we expect bigger motivation for learning mathematics to be achieved and this will lead to excellence in mathematical education.

This project would be very beneficial, as it would help the teachers, in attempt to produce motivated and responsible learners, who relate positively to each other, to staff and to the surrounding community. By making mathematical learning more attractive and accessible, we make sure that the students are well-prepared for the exams they will take, which are essential for their future development. In addition, it would help young students to develop self-confidence and to successfully deal with significant life changes and challenges. Nonetheless, it would enable them to make a positive contribution to the society, by developing the expertise and experience needed to claim their rights and to understand their responsibilities, and by preparing them for the challenges and opportunities of working life.

Improving students' motivation to learn mathematics is crucial for many distinct reasons.

This motivated us to make research about new methodology and create innovative ways of teaching and learning Mathematics using modern technologies, and this also satisfies the European priority to "support the professional development of teachers as mediators of creativity and innovation; promote the incorporation of creativity and innovation at all levels of education and training" [2].

We want the teachers together with the Universities professors and volunteers in associations that work on this topic to share their experiences and thoughts and develop new methodology for learning math skills through democratic process of choosing teaching methodology. Using this method, they will learn more, they will be more motivated, they will use innovative technologies to study, and big percent of the students will like to continue with their education in the field of science and technology area. This is an approach focused on student centered and problem-based active learning, and fostering critical thinking skills.

We believe that the implementation of the project will increase the underachievement in the basic skills of mathematics, science and literacy through this new effective and innovative teaching method and make excellence in mathematics education.

There has to be an expectation of what a pupil might be assumed to "know" when teaching a topic. The aim of the teachers is to build on and advance that knowledge, to ensure that it has been incorporated into the pupils' mental structures appropriately, including knowing about the limitations of use of that knowledge and providing opportunities for pupils to use and apply that knowledge in a variety of contexts.

From a constructivist position it would appear that "good practice" is in providing almost any situation, activity, game, web page activity whereby by some magic process pupils automatically develop the concepts they need. These processes need to be more carefully identified and carefully designed series of activities or even actual "tutoring/teaching/chalk and talk" where by the learner is helped to properly develop the cognitive structures. The good practice should enable the student for easier solving of practical problems. The teacher should be a guide to the students and should prepare them for successful individual persons. So, he should teach them all the steps which could be applied as strategies in the process of problems' solving [3].

Good teaching enables good learning to take place by treating students as thinking individuals who can operate mathematically. It involves creating an appropriate environment in which students can respond to high levels of expectation and challenge. They are kept on the edge of thinking. By National Curriculum Non-Statutory guidance: "The teachers' job is to organize and



provide the sorts of experiences which enable pupils to construct and develop their own understanding of mathematics, rather than simply communicate the ways in which they themselves understand the subject”.

Based on the received information and experiences a list of good practices is provided. This list is a part of the analysis report, which will be published electronically. Some of the collected methods will be uploaded on the e-platform (computer and mobile version) and will be a part of MATHDebate process. In this way, they will be visible for all interested parties – teachers, students, parents...

Remark: Some of the methods are included in more than one group. It means that they could be applied in different situations and areas in mathematics.

CONCLUSION

The Analysis of teaching methodology is a first step of the process of developing a new methodology and creating innovative ways of teaching and learning Mathematics using modern technologies. This approach satisfies the European priority to "support the professional development of teachers as mediators of creativity and innovation; promote the incorporation of creativity and innovation at all levels of education and training”.

The done analysis of good practices would help to the teachers to change the conditions in the classroom, the approach in teaching of the material from the curriculum. This analysis would be beneficial for the students too, because by using of these good practices the students would be able to choose the way on which their teachers will teach some lesson. The using of ICT in the teaching process would be helpful for the teachers and the students for the increasing of the digital competences in the process of successful development for the persons – carrier of the economy in 21st century. The e-platform, which included the done analysis of good practices, will be available for all who want to try and use this new tool to increase the motivation for studying mathematics. In addition, will be listed the chosen teaching methods which are used in different countries in Europe and beyond. For all teaching methods, the main information, which were needed for the project, are included.

Better competence of the teachers since they will look on the teaching process from the point view of the students and have better understanding for it, strengthening the teachers' digital and linguistic competences, the possibility of networking and exchange of good practices, competitiveness among teachers, comparability of the common European educational space, are our main priorities.

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