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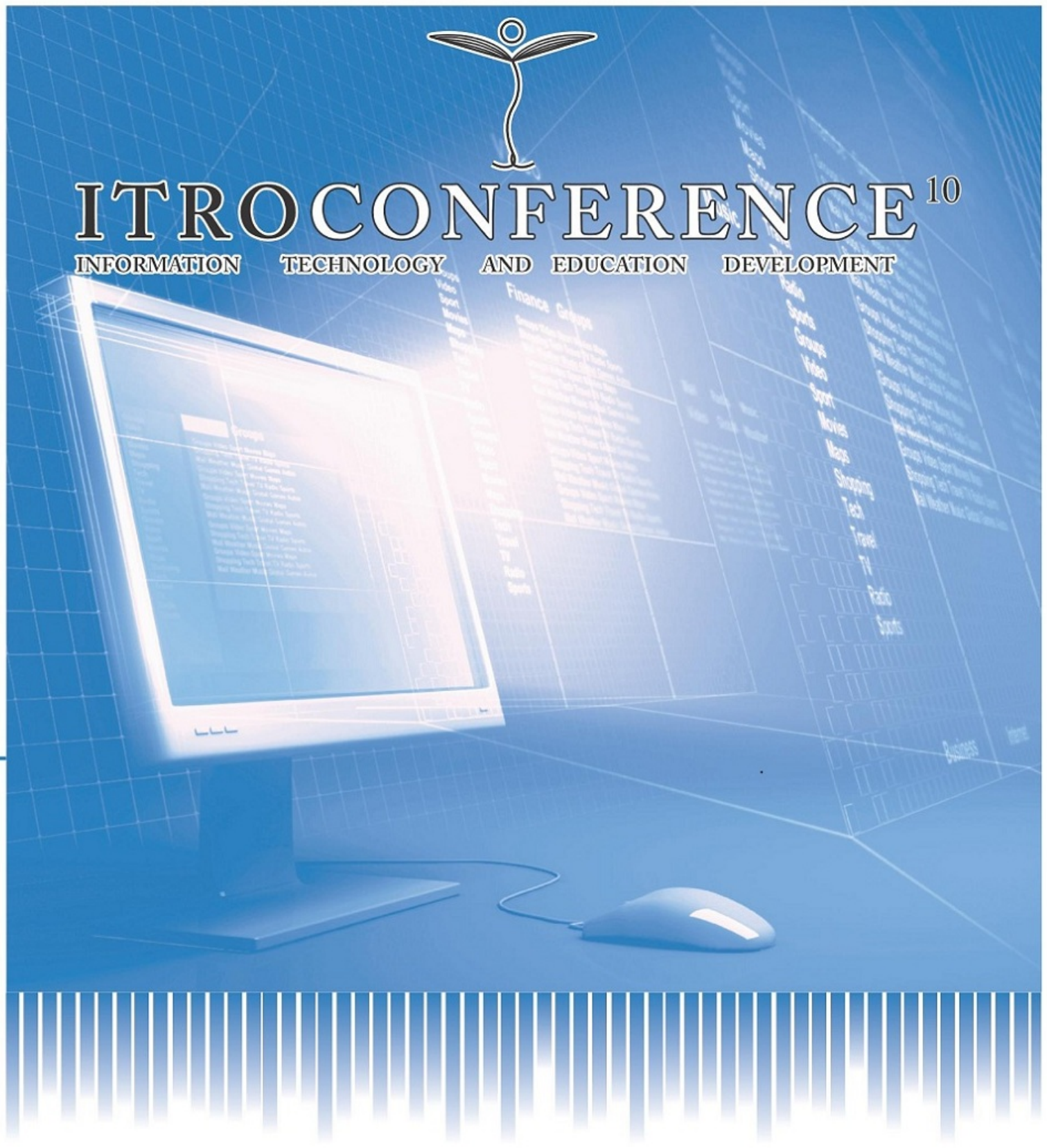

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INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT

PROCEEDINGS

ZRENJANIN, June 2019

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X INTERNATIONAL CONFERENCE OF

INFORMATION TECHNOLOGY AND DEVELOPMENT OF EDUCATION ITRO 2019

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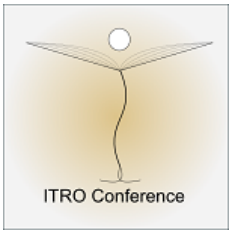

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With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2019 is also published.

INTRODUCTION

International Conference on Information Technology and Education Development (ITRO 2019), was held the jubilee tenth time. Since the very beginning, the conference has been connecting science, profession and experiences in education. Information technologies influence educational processes and student achievements. Contemporary topics relate to Interactive EBooks and electronic Teachers logbooks. Thematic fields of the conference are alined with general, but olso with national trends in education:

- Theoretic and methodology questions of contemporary pedagogy
- Digital didactics of media
- Modern communication in teaching
- Curriculum of contemporary teaching
- E-learning
- Education management
- Methodic questions of natural and technical sciences subject teaching
- Information and communication technologies
- Dual education.

The conference work was contributed by plenary lectures covering various aspects of ICT in education development:

- *Digital transformation of educational system in Higher Education*, Branko Perišić, Faculty of Technical Sciences, University of Novi Sad;
- *Security issues of e-learning system*, Igor Franc, E-security, Belgrade;
- *From E to ES teacher logbooks*, Žarko Mušicki, primary school "Žarko Zrenjanin", Novi Sad;
- *Canvy, The Thrue Story of Mobile App*, Marius Marcu, Politechnica University of Timisoara, Romania.

The Proceedings containes 59 articles based on research and scientific work in the field of information technologies in education.

The conference was financially supported by the Provincial Secretariat for Higher Education and Scientific Research, Novi Sad. The Technical Faculty "Mihajlo Pupin" has provided the necessary technical support.

The ITRO Organizing Committee would like to thank to the authors of articles, reviewers and participants in the Conference who have contributed to its tradition and successful realization.

Regards until the next ITRO Conference,

Chairman of the Organizing Committee

Jelena Stojanov

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SCIENTIFIC PAPERS

ERASMUS+ Projects as Tool for Improvement Mathematics Teaching

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Abstract - The importance of Mathematics has never been greater than now. To face the challenges of the 21st century each young person needs to have the confidence in using mathematical skills, and Europe needs both specialist mathematicians and a highly numerate population. These skills are crucial for a wide array of analytical, technological, scientific and economic applications. Teaching students to become more adept in mathematics and to appreciate its usefulness is of paramount importance for their future. For that goal, the EU provided financial support for many projects that will help in improvement of the mathematics teaching. In this paper are analyzed and presented some mathematical Erasmus+ projects. They can be used as a tool for bringing innovation and improvement of the teaching process.

I. INTRODUCTION

Mathematics is one of the sciences which is crucial for other sciences' development. During all history, mathematics has greatly contributed for advancement of the other sciences and almost whole technology. The important role of mathematics recognized Cockcroft, for example in [1], he writes: "It would be very difficult, perhaps impossible to live a normal life in very many parts of the world in the twentieth century without making use of mathematics of some kind." The applications of the in a daily activities and situations, its application in other sciences and all spheres of the social life explain the importance of knowing and understanding the basic mathematical concepts. Mathematics has become one of the most important subjects in the school curriculum during this century. As modern societies have increased in complexity and as that complexity has accompanied rapid technological development, so the teaching of mathematics has come under increased scrutiny. So, it is needed to show a special attention to the mathematical education and process of learning mathematics in the schools, [2]. Each student can easily realize that the natural and technical sciences cannot be developed without mathematics.

The mathematics is not popular school subject between students. It can lead to both anxiety in children and teaching difficulties in teachers. Together, these two difficulties can increase the time spent in teaching and learning mathematics. Students' success in mathematics depends upon attitude towards mathematics. Attitude towards mathematics plays a crucial role in the teaching and learning processes of mathematics. Many papers have been done about which factors influence of the students' attitudes towards mathematics. The teaching method, the support of the structure of the school, the family and students' attitude towards school affect the attitudes towards mathematics [3]. The way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from mathematics [4,5]. Most of the teachers in primary schools used old and traditional methods when they are explaining the basic mathematical concepts. The students are facing up with material that is so many abstract and they could not make correct perceptions. They are boring at the math classes and become indifferent about their achievements and their results in the mathematics. But if teacher uses different methods and relates the mathematical contents with other subject and real situations, the students will show more interest and they would like to include in that kind of activities.

One of the problems facing education in is the problem of the lack of learning process. In the learning process, students are less encouraged to develop the ability to think. Usually in the classroom, the teachers more focused on students' ability to memorize information and methods. The students' brain is forced to remember a variety of information without being required to understand the information that is remembered and constructed into meaningful learning experiences, [6]. Students gained poor mathematical knowledge, have lack of interest for studying mathematics, mathematical incompetence, not like challenges, not doing homework, cheating on the tests. These are only few serious problems in mathematical education. The teachers usually are trying to overcome these problems by using different methods and approaches, but they do not discover the basic

problems for such students' behavior. These problems occur due to lack of teachers to recognize, explore, grow and develop mathematical power that exist in students.

The author in [7] consider the situation in mathematics education. He raises the question of whether education in mathematics has become too much comfortable. The author said that is essential the teachers maintain focus on the teaching and learning of mathematics, to flourish in such a competitive research environment. It is also important that the research empowers people, and that the given recommendations and implications improve systems, especially for the disadvantaged. The teachers should provide classes fulfill with fun research. Societies and communities are changing rapidly, which mean that the teachers' work becomes more complex and integrated. In addition, the teachers should simultaneously focus on practice and theory, rather than one or the other. The theoretical frameworks and learning models we develop will need to have the flexibility to be applied in various practice-based contexts. In that context in the last period are realized many projects in order to bring innovations and modern and practical trends in mathematical education.

II. ERASMUS+ PROJECTS AS A TEACHING TOOL

Erasmus+ is the European Union programme for education, training, youth and sport. This action runs for seven years, from 2014 to 2020, with organisations invited to apply for funding each year for life-changing activities. Erasmus+ aims to modernise education, training and youth work across Europe. In the framework of the Erasmus+ programme many projects are realized and some of them are still in progress, which are in the field of mathematical education. The most of them have high percent of innovation in their basis. The main goal of this kind of project is to provide a new methodologies and methods for improvement of the education process. The starting point at almost all of them are obtaining better interest, motivation, knowledge and greater learning outcomes. At the EU level, the Education and Training 2020 strategy underlines the importance of providing efficient and equitable education of high quality in order to improve employability and allow Europe to retain a strong global position. To achieve this objective, continued attention must be paid to raising the level of basic skills such as literacy and numeracy (Council of the European Union, 2009).

According these priorities there are many projects in the field of mathematical education. We will analyze some of them in order to accent the importance of their results and to encourage the teachers and students to used them.

"Who is afraid of Mathematics?", (2017-2019), [8] is a project that have attempt to dismantle math phobia that pervades students in a way that promotes creativity and innovation. This project has made teaching student-centered, active, experiential authentic, collaborative and challenging presenting ways in which mathematical concepts, that children learn, are applicable and related to their daily life. The main objective of this project is to encourage students and teachers to update their knowledge and their skills in using ICT as a means of communication and information exchange as well as to carry and exchange mathematical activities: digital imagery, digital presentations, web logs, project web site, digital video recordings, web conferences and a variety of the web tools.

Maths is everywhere!, [9]. All the participants have made the project innovative because students accessed a more practical and functional aspect of mathematics by creating mathematical games and puzzles, joining in tasks where they can understand the purpose of mathematics and made their own mathematical problems for others to solve. In the framework of the project, many examples related to profit, loss and totaling money are considered. In some tasks the students are involved in creating and solving puzzles, rebuses and they are inspired to create their own games. This enabled their mind to exercise and practice logical thinking.

Smart Mathematics teacher, [10] – One of the main objectives of the project is to enhance math teachers to improve their digital competencies to use mobile applications in the teaching process and to adopt innovative digital practices based on the mobile applications. One of the important results in this project is creation of the E-Directory in which are presented 67 useful applications. These applications can enable math teachers to differentiate and individualize the teaching/learning process according to the students' interests and achievements. With the help of mobile applications, the traditional math lesson is varied with innovative, student friendly and playful learning tools. Teachers are free to choose any mobile application from the list that suits his teaching needs best according to the area of focus: The mobile apps are classified according to the area of focus:

- Numbers and Calculations
- Mixed
- Expressions, equations and inequalities

- Geometry
- Measures and Measurements

MatLan-Learning math and languages through research and cooperation, [11], throughout these project participants have showed that the organizations of workshops can substitute the abstract approach in the classroom with new approach where the students can mathematically investigate issues that no one has answered yet.

Math-Labyrinth: Increasing the level of knowledge through solving mathematical problems, [12], is an Erasmus+ project where as a main result is an interactive book that can be used by teachers and students. The interactive guidebook is divided in two parts including mathematical problems from students in the first, and more complex problems developed by the teachers in the second one. All the areas in this interactive book are related to everyday situations and according to the syllabuses of the national examinations. It is developed to enhance the brain's ability to visualize and transform knowledge into a solution to a real-life problem.

MathDebate - The voice of students - searching excellence in math education through increasing the motivation for learning, [13] is a project in which are developed a new MathDebate method, e-platform with included e-forum and tutorial for using of this platform. The goal of this platform that is source of videos, presentations is to offer a possibility of the students to choose on which method they want to study some material. They debate for the method with the other students from the class and after that teacher present some teaching unit, by using of the chosen method.

The project "Math-GAMES - games and mathematics in education for adults – compendiums, Guidelines and courses for numeracy learning methods based on games", [14], is a project that is realized in order to save traditional and famous games in different countries from a loss and to use them for educational purposes. In the framework of this project are created learning courses for using traditional games with normal and lower-skilled people fighting numeracy. In the project is provided a list of different traditional transnational games (photos, game instructions), which can provide social integration. As traditional games are taken board games, card games, role-plays, acts, folk games involving dramatics, e.g. but not computer games. This is an excellent opportunity for teacher in mathematics to use the obtained project' result and to include games at the mathematical classes. LeMath - Learning mathematics through new communication factors, [15]. Generally, it is known that mathematics is a subject that is not popular among the students. The students usually find other things that are more interesting, instead solving tasks and learning mathematics. For this purpose, teachers should try to use, but for educational purposes, the same things or similar tools as electronic games, game through theatre or competitions, that are favored to students. In this project is created a new methodology in teaching and learning mathematics, with the creation of two main tools that can be used by teachers. The two methods are MATHeatre: Teaching and learning mathematics through math theatre activities and MATHFactor: Teaching and learning mathematics through mathematics communication activities. It is provided theatre scenarios- stories with math elements and guidelines and MATHFactor samples and guidelines.

There are many other similar Erasmus+ educational projects that offer many useful results, which can be used not only in mathematics but in the education process of other sciences.

III. CONCLUSION

The projects have important and useful results that can be included in the education process. The developed approaches and methodologies should be tested and applied not only in the schools that are partners and doers of them, but also in the other schools and educational organizations. All the results of this kind of projects are available to the internet for all users, teachers and students, so everyone can use them. Actually, the obtained results in these projects are used in the first five years after the project is finished, but after that, nobody cares about these results. Today when the knowledge is easily available, the teachers are forced to have innovative approach and to make many changes in the teaching process. Because of the lack of students' interest and high innovation in computer and digital technology, the teacher must get over the traditional approach with new modern and fun approach in which will include the mobile phones, computers, and tablets. The obtained results of the Erasmus+ project are excellent opportunity and source for new ideas, methodologies, methods and approaches. The teachers should use and find appropriate way to include these results into the teaching process and to announce all these possibilities to the students in order to show that mathematics can be studied in a different and more interesting way. Students should meet with new approaches and to understand that mathematics is present in everyday situations and different fields. The students should learn that

some things that at first sight seem to have no connection with mathematics, such as music, sports, art, theater can be linked to mathematics and its basic concepts. It will be very useful if all these results of the projects that are applicable in education process will be put on one website as additional educational tools for teachers and students.

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