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Path to a Knowledge Society -
Managing Risks and Innovation

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Prof. Dr. Miomir Stanković and Prof. Dr. Vesna Nikolić

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Training Pre-service Teachers for using Educational Software in Order to Improve the Quality of the Mathematics Teaching in Primary Education

Radoslav Božić¹, Ivica Nikolić², Violeta Petković³

^{1,2,3}Faculty of Pedagogy, Educons University, Sremska Kamenica, Novi Sad, Serbia

¹radoslav.bozic@gmail.com, ²profilov@gmail.com, ³violeta.petkovic@gmail.com

Keywords

Educational software, mathematics, visualization

Summary

The application of mathematics is present in different disciplines and that is one of the most important reasons for the significance of the mathematics education at all levels of education. However, a prerequisite for the successful study of mathematical contents in secondary and higher levels of education is the acquisition of basic mathematical concepts and their properties, which is being realized during the primary education [1]. Bearing in mind the foregoing, the teachers in primary education have a very important, but not easy task – to introduce the students into elementary mathematical concepts, without defining them [2].

However, the teachers face the numerous challenges in presenting elementary mathematical concepts and guiding the students through the learning process [2-4]. One of the most common challenges is presenting the geometric concepts, as well as introducing the students with the properties of the geometric objects [2]. For a successful analysis of the geometric object properties, an adequate visualization is necessary. In order to visualize geometric objects, the teachers usually use

sketches and 3D models, which can be very helpful [5].

With the development of the mathematical software, new possibilities in visualization of the geometric contents have appeared. One of the most commonly used educational software, adequate for the visualization of geometric object, but also for work with different mathematical contents, is *GeoGebra*. This software is free and easy to use, which enable the students in primary education to use it, with the help of the teacher [5-7]. Visualization of the geometric contents can be realized if this software is used by a teacher, for presenting the contents to the students, but, using the software by the students (to the extent that this is possible) contributes to greater students' engagement and the development of their digital competencies [8].

For the successful application of this software in teaching and learning mathematics, it is necessary for the teacher to be well trained in using this software. At the Faculty of Pedagogy, Educons University, pre-service teachers are being trained in using this software within the course of Mathematics teaching methodology. This training includes the methodology approach in working with the primary school students within the *GeoGebra* software environment. The teachers must be very careful in using the software at this level of education, in terms of the

contents and the task selection, but also in terms of students' working within the software environment [9].

If used appropriately, taking into account the age of the students, *GeoGebra* software can help students to observe geometric objects in different ways and, also, to analyze the properties of the observed objects and the similarities, differences and connections between the different objects. The practice, but also the numerous research, has shown that the use of this, or similar mathematical software, with the students in secondary or higher education, have significant benefits in terms of the students' achievements in learning different mathematical contents [5,6,10]. It can be expected that the use of this kind of software can contribute to the primary school students' better achievements in learning mathematical contents, with the accent on the geometric contents.

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