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Development of the Intelligent and Affective Tutoring Platform for pÿ Mathematics A case study fo

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Title:	Development of the Intelligent and Affective Tutoring Platform for Mathematics – A case study for Primary Education
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Author:	Dimitrios A. Mastorodimos
Abstract:	<p>Mathematics has always been one of the most important teaching subjects at all levels of education. If someone understands the fundamental concepts of Mathematics, then he will have a perpetual interest in them, and study them forever. But, if he encounters difficulties and he cannot overcome them, these difficulties will follow him on his later academic path. Fractions are one of the key areas of algebra taught since the early years of a student's education. At the same time, fractions are one of the difficult areas of Mathematics, at least for primary school students.</p> <p>Understanding the concept of fraction is difficult for students, since it is an abstract concept. It is the first abstract concept in Mathematics that met the young learner. The use of examples from everyday life is a technique that teachers use in the teaching process in the introduction of the concept of fractional unit. However, if teachers have to present more difficult concepts of fractions, such as basic operations, comparisons and other concepts, these examples do not help so much. This requires a better and more functional way to represent fractions. Inevitably, the use of tangible tools, graphic representations and digital tools are very good practices for teaching and understanding fractions.</p> <p>The rapid evolution of technology, the development and spread of the Internet as well as the modern digital tools available to the Internet, provide the possibility of developing understandable interactive representations for the teaching and understanding of fractions and their basic operations. Using all these modern technological means, students have the ability to understand abstract concepts and build basic concepts in fractions. The thesis contributes in a number of ways. At the beginning, the difficulties encountered by students in the fractions and basic operations were investigated. Then the views of teachers on the difficulties students encounter in teaching fractions were explored.</p> <p>The results of the literature review on digital tools that help students in fractions, as well as the empirical research carried out, led to the definition of key elements for the design and implementation of a new educational tool for teaching and understanding fractions. Taking this into account, the Student's Knowledge and Affective level for Fractions in an Open System (SKAFOS) system was designed and developed.</p> <p>The results of the empirical research that followed showed that SKAFOS helps students to understand fractions with the active participation of them, and also their experimentation with the software. Students using the capabilities of the SKAFOS tool were led to a better understanding of fractions using multiple representations. The results also showed that the dynamic characteristics of the SKAFOS tool contributed to the understanding of the fractional unit, to the building of sufficient representations for the concept of fractional unit, and the comparison of two fractions with common or no common components (nominator or denominator).</p>