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EDUCATIONAL SOFTWARE FOR MATHEMATICS; A GREEK REALITY

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Abstract

Multimedia educational software has become an integral part of traditional educational courses, enhancing students' skills and reinforcing teachers' pedagogical role. This paper presents a survey concerning multimedia educational software for teaching mathematics in the Greek Secondary Education System.

1. Introduction

There is a lot of debate among educators about the benefits of using technology in the traditional educational system. The shortage of methodologies for handling the new training needs indicates the important role of technology. This paper has been motivated by the strategy of the Greek Ministry of Education to employ educational software in teaching math courses in the secondary education. These tools assist students to comprehend basic mathematical concepts, to improve their analytical capabilities and develop their solving skills. All these are achieved in an entertaining, pleasing and interesting pedagogical way, despite place restrictions and time limitations. A combination of optical and acoustical mediums through the use multimedia applications supports these methods [1].

2. Classification of Mathematical Tools

The classification of the educational mathematical tools according to their functionality and degree of contribution in the training is essential and compulsory. A further meticulous analysis concerning these tools' categories is presented below [2].

2.1 Integrated Mathematical Courses

These are sophisticated tools supporting the construction of a course. Their main task is to simulate a traditional class. Thus they contain theory, examples, exercises, tests and quizzes. Calculators and dictionaries may even support them. Software of this type is distributed over the Web [4], or on CD-ROMs [3]. Software available over Web can be grouped into two categories. The software in the first category can be downloaded from Internet to a local computer. Then the user can run the software whenever he likes. The software in the second category is interactive over the Web. This characteristic restricts the user to access the software over the Web costing him extra money. Greek companies provide a mass of integrated courses on CD-ROMs and it is worth to mention that they are being scheduled in relation to the program of Greek Secondary Education System [9].

2.2 Authoring Tools

They can be used to construct the backbone where the course material will be placed [5]. The educator can modify the framework and the training material or rearrange the order of mathematical themes. These tools are quite powerful but not so flexible for a simple user. The teacher can easily adjust the educational course according to the Education Ministry's orders, although a lot of programming skills might be required. Unfortunately, there are not Greek solutions to this direction. Besides, these tools are so flexible and in such a way that a teacher can build up a mathematical course content in every preferable language (e.g. Greek) for keeping up with the guides of the current training system.

2.2 Mathematical Games

Games attract students' attention and they learn pleasantly in a pedagogical way [6]. Students can be educated and amused simultaneously as these kind of tools appear more appealing, interesting, impressive and exciting too.

2.3 Mathematical Quizzes – Puzzles

These tools assist students to improve their analytical skills and sharpen their memory capability [7]. Software companies provide also ready–made quizzes for constructing Quizzes or Puzzles according to the teacher's preferences on various subjects.

2.4 Calculators and Dictionaries

In addition to mathematical software there is need for tools that work supplementary in education procedures [8]. The survey proofs the existence of numerous software tools that help students to calculate mathematical functions and/or to find out words in mathematical dictionaries. Friendlier interfaces facilitate more attractive ways of searching and calculating.

3. Conclusions

Educational software programs and in particular multimedia applications in the field of mathematics are fully recommended for upgrading the traditional education system. That is justifiable since all tools put forward a unique way of practicing and comprehending the demanding science of math. Software available in this category supplies a friendly user interface and an exceptional multimedia environment, which stimulates students to give proper attention to math science and its applications. Although Integrated Courses frequently focus on just one mathematical area, such as calculus, algebra, geometry, trigonometry, it offers adequate knowledge on the subject examined. The mathematical material covered might be limited, but it certainly enriches students' knowledge and critical skills. Authoring Tools also perform a very essential role in the training arena. This is a direct outcome since this software offers a variety of math examples, problems and exercises for fully assimilation of mathematics concepts and basic fundaments. Moreover, Dictionaries, Calculators and Games have been evaluated absolutely positively since all these tools fully serve their purposes. In Greece, available integrated software put emphasis on particular syllabus based on the program issued by the Ministry of Education. Thus, trainees have the opportunity to study and concentrate on those mathematical areas, which are necessary for them in order to cope with the final exams for accomplishing their way to universities. Despite the fact that few Greek software tools are available in the market, they fully cater for students' needs because they contain all the crucial and vital aspects of math science. However, mathematics knowledge beyond the primary goal stated above is not frequently met. Nevertheless, Greek multimedia applications in this area are improved and new tools are introduced.

On the other hand, the analysis of Greek schools' communities pointed out the obstacles concerning the appliance of such software tools in secondary Education. Researching explicitly the Mathematical Educational Programs' framework two major issues have been retrieved. The first one refers to the Social Acceptance of the multimedia tools. The users easily accept most of the applications examined in this survey, since the communication between students and teachers is promoted. But a number of media occasionally reveal discriminating trends, or even more social unaccepted ingredients. The second component is related to the Practical Acceptance of the mathematics multimedia tools. It is concerned with the evaluation of the course material included in the software application as well as its presentation and controlling, and finally the examination procedures. Obviously, the international software could not be compared with the Greek one as the last includes course material immediate related to the program of the Ministry if education. This is the reason why our survey the comparison of Greek software tools surpasses the international applications regarding the practical acceptance criteria, the pedagogical parameters and the schedule components.

It is obvious that this technological revolutionary era lead to innovative teaching procedures. The intention of catching up international training trends demands further survey and study of mathematics multimedia tools. Software's capability regarding tutoring pedagogical potentiality ought to be carefully examined. The required conditions and circumstances for introducing such media in Secondary Education should be accurately determined. Besides, a respectable number of questions must be answered. Will future mathematics applications meet students' and teachers' expectations totally, will they provide ideal pedagogical environment and will they facilitate a creation of sophisticated multimedia applications in the mathematical field for implementing learning accomplishments?

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