

## **MULTIMEDIA INTERACTIVE MATHEMATICS COURSEWARE: DEFINED INTEGRAL APPLICATIONS**

**Pănoiu Manuela<sup>\*</sup>, Pănoiu Caius<sup>\*</sup>, Muscalagiu Ionel<sup>\*</sup>**

*<sup>\*</sup>Technical University of Timișoara, Engineering Faculty of Hunedoara,  
str. Revolutiei nr. 5, cod Hunedoara, Romania  
Tel: +40-254-207537, fax: +40-254-207501  
{m.panoiu, c.panoiu, mionel}@fih.utt.ro*

Abstract. – The informational society needs important changes in educational programs. The informational techniques need a reconsideration of the learning process, of the programs, textbook structures, a reconsideration of the methods and organizational forms of the didactic activities, taking into account the computer based training and self instruction. This paper introduces a software package, which can be used as multimedia interactive courseware.

This paper presents a graphical user interface implement in Borland Delphi useful for computer-based training. We chose a few defined integral applications.

**Key words:** informational techniques, mathematics courseware.

### **1. INTRODUCTION**

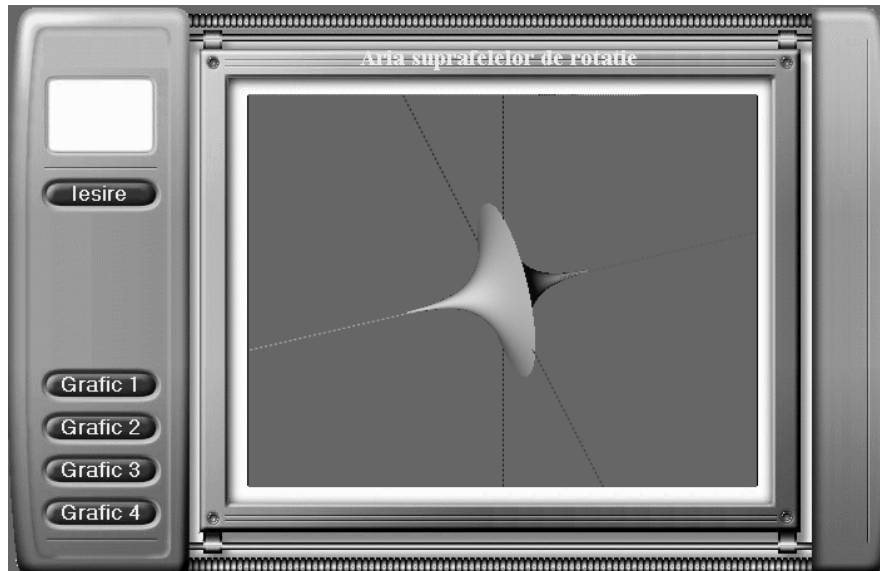
The informatics society makes sensitive modification in education programs. In this scope, the school must prepare programmers, maintenance technicians, etc. In the same time it is necessary that the teacher make ready to use the computer in education process. These informational techniques impose to reorganize the contents of the education process, of the programs, course books and manuals, to reconsider the methods and organization forms of didactic activities, which follow to be center on individualization of the teaching process.

### **2. APPLICATION REALISED**

From desire of improve the instructive educational process, using modern teaching methods, was realized an courseware on “*Mathematical analyze*” discipline, where the subject “*Defined integral application*” was especially developed.

The application is meant to be helpful both in the didactical process, in teaching an important chapter of Mathematical Analysis, but also for the student who will thereby take in much easier the new items of information. We are talking about the chapter “Applications of the Definite Integral”, of which we selected four lessons to be presented, namely: „The Geometrical Interpretation Of The Definite Integral Of A Positive Function”, „The Volume Of Rotation Bodies”, „The Length Of the Graph Of A Derivational Function With A Continuous Derivative”. The application is a real help for the lessons that deal with the volume of rotation bodies and the area of rotation surfaces, where, by means of 3D graphical tools, we describe bodies as the rotation paraboloid, hyperboloid, ellipsoid and astroid. The students can see these bodies from different angles, and they are also lighted by means of two sources of virtual light, placed in two different positions.

The application, implement in Borland Delphi 6.0, under Microsoft Windows, was three parts structured: a theoretical presentation part, a simulation part, and a questionnaire. From the main application window, it can select by a main menu one of the five lessons. After an option is selected, a new window is opened. First, a theoretical presentation for the selected lesson was present. The user can read this theoretical part, and it can print this or view a simulation, or it can perform a test for knowledge verify. The most interesting option is the graphic representation, like one is represent in figure 1.



**Figure 1 – Graphical representation**

### **3. CONCLUSIONS**

Taking into consideration the massif computerization of education, the endowment of the educational institutions in Romania, whether they are elementary schools, high schools or universities with computers, the connection of all educational institutions to the INTERNET, imposes an ever larger training of students and teachers alike for an educational process increasingly based on the computer. Considering the fact that the youth are more interested by a problem that is introduced by means of the computer, rather than by classical methods, it is more and more desirable that with certain subjects such as Mathematics, Physics, Chemistry, Biology, Geography or even foreign languages, lessons be computer aided.

### **3. REFERENCES**

1. Anne Mcdougall, David Squires, Empirical study of a new paradigm for choosing educational software, *Computer Education*, vol 25, no 3, Elsevier Science, 1995
2. Glenn W. Rowe, Peter Gregor, A computer based learning system for teaching computing: implementation and evaluation, *Computer and Education*, Elsevier Science, 1999
3. R.D. Harding, S. W. Lay, H. Moule and D. A. Quinney, Multimedia interactive mathematics courseware: the matematics experience within the renaissance project, *Computer Education*, vol. 24, no 1, Elsevier Science, 1995
4. E. Scanlon, C. Tosounoglu, A. Jones, P. Butcher, S. Ross, J. Greenberg, J. Taylor and P. Murphy, Learning with computer: experiences of evaluation, *Computer Education*, vol 30, Elsevier Science, 1998