Computer Aided Education System SuperTest.
Present and Prospective

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This paper analyzes the testing and self-testing process for the Computer Aided Education System (CAES) SuperTest, used at the Academy of Economic Studies of Chişinău, Moldova and recently implemented at the University of Bacău, Romania. We discuss here the future of this software, from the Information Society and Knowledge Society point of view.
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Introduction
Computer assisted instruction refers to instruction presented on a computer. Educational computer programs enhance teacher instruction in several ways. They are interactive and can illustrate a concept through attractive animation, sound and demonstration. They allow students to progress at their own pace and work individually or solve problems in a group. Computers provide immediate feedback, letting students know if their answer is correct (this way, they cannot continue to practice with wrong skills). They keep track of the student's errors and progress. Computers capture students' attention and engage their spirit of competitiveness.

An important category of educational programs is represented by testing programs. Teachers' experience shows that many students give up the study, having a false impression that they already understood. The role of self-testing is to guide them towards the learning components that they haven't got thoroughly into. On another side, evaluation gains a plus of objectivism when realized on a computer. Considering the complexity of nowadays environment, the goals that teachers must establish for their students and for their own instructional activity, testing systems appear as useful instruments [9]. In what follows we present such a system, elaborated for computer science courses and already tested with students in economics and informatics.

2. *SuperTest* basic ideas

SuperTest is a testing software, representing only a piece of the complex system of computer-aided instruction, in the traditional education process at the Academy of Economic Studies of Chişinău, Moldova as well as in the distance-learning process that is currently developing at the University of Bacău, Romania. The current stage is defined mainly by the developing of the databases of *SuperTest*. Experience gained while using this software will indicate what improvements have to be realized, in order to make it flexible and adaptive, modern and intelligent, friendly and rigorous altogether.

The *SuperTest* knowledge databases are made up using items; each of them belongs to one of the following categories: True–False, Multiple Choice, Matching, Filling, and Cross–Word. Based on these categories, and using the Randomize function, tests are constructed for these purposes: information gathering, personal training, self-evaluation and control. In information gathering phase, the teacher extends and/or actualizes the knowledge database. In personal training phase, the teacher and/or the student select the knowledge base in order to complete future tasks. In self-evaluation phase, the student chooses the item categories in order to prepare for the evaluation step (he or she could observe the time needed to complete the tests). In the control phase, the teacher chooses the database(s) for the tests, sets the

number of items per test and the allowed time. Using a more sophisticated randomize method, the CAES *SuperTest* constructs a test and proceeds with the evaluation.

The infrastructure of the automatic control process is based on *Monitor* - a system that sets the personal data of the student, the course title and section of the course, the score and other internal data.

The *SuperTest* knowledge databases use [1-6] while the administration part is based on [11-13]. The theoretical level is based on [7,9] and the semantic interpretation of the natural language is as in [10].

3. *SuperTest* knowledge bases

The *SuperTest* knowledge databases are structured on the needs of coherent presentation and safe management of the tests.

Each course database BC_i ($i=1,2\dots$) consists of a set of chapters BC_{ij} ($j=1,2\dots$). The whole BC_i is used at the course end to test the student in order to compute his or her final grade. The chapter databases are used in cumulative evaluation method (CEM). The score at chapter j from course i influences the final grade for course i. As an example, if the teacher sets two chapters ($j=2$), each of them having 20% weight in the final grade, then the formula is:

*final_grade= test_1*0.2+test_2*0.2+final_test*0.6*

Comment. Usually, these formulae are set by the University Senate.

Any knowledge database has five types of items: True–False, Multiple Choice, Matching, Filling and Cross–Word. The True-False item has the lowest number of points in case of correct answer. The Matching item has n elements in a first column that have to be linked with other n elements from a second column. The number of points for all correct matching is the highest. The Multiple Choice item has a requirement and l ($l=3,4\dots$) choices, each of them close to that requirement. The number of points in case of correct answer is set by the teacher. The Filling item has a part that has to be written by the student. The Cross-Word item is based on the Course Dictionary, and the student has to fill in a table containing item of Filling and Matching type. The testing database could adapt the tests and extract only the types selected by the teacher.

4. The courses and knowledge bases

The courses from *SuperTest* Computer Aided Education System (CAES) consist of lectures, laboratory works, fixing themes, dictionaries, methodic specifications and items for testing and self-testing. A special attention is paid to electronic lectures.

SuperTest implements the courses: Informatics Bases, Databases and Communication Systems, Economic Informatics and Birotics.

The Informatics Bases course has the following chapters: History of Informatics, Software and Hardware, Computer Based Informatics Systems, Present and Perspectives in Computer Systems, Networks, Information Societies and Knowledge Societies. This course is a basic one, with 500-items knowledge databases. It is designated for all students enrolled in first year at ASEM, both at English and Romanian line of study.

The knowledge databases are compiled by prof. univ. dr. hab. Dumitru Todoroi, the *Computer Aided Education Systems Project* coordinator and by conf. univ. dr. Elena Nechita, the coordinator of the team from University of Bacău.

The database organization was set up by the team from ASEM Laboratory, leaded by Elena Chicu. Lect. drd. Olga Chicu designed and implemented the *Engine* and the *Monitor* of *SuperTest*, available since 2004. At now, hard work is done in order to design the *Intelligent Monitor* and to adapt it at DEI-Multimedia [8].

The courses Databases and Communication Systems, Economic Informatics and Birotics contain the chapters: Windows, Excel, Access, Internet and PowerPoint, both in English and Romanian and has a knowledge database with 700 items. The team coordinated by Dumitru Todoroi and Elena Nechita consist of drd. Gloria Cerasela Crişan, drd. Diana Micuşa, comp. Zinaida Todoroi, drd. Iulian Marius Furdu, Elena Chicu and her coworkers.

5. Present and perspectives

The *SuperTest* Computer Aided Education

System (CAES) is successfully used at ASEM for the courses: Birotics, Computer Sciences Bases, Data Bases and Communication Tools, Multimedia Communications, Management Information Systems, Accounting Information Systems, Banking Information Systems, Microeconomics, Macroeconomics, and a. The formula for the final grade is:

final_grade=
test_1*0.2+test_2*0.2+activity*0.1+final_test*0.5

The *SuperTest* Computer Aided Education System (CAES) is included in the general management system for ASEM. The next version of *SuperTest* would include the DEI-Multimedia [8], with all its Knowledge Bases in: text, audio, graphics and video forms of its presentation. The workload will reflect the spread of DEI-Multimedia on the courses and the data types included. An intense job has to be done in order to design and feed the database with True–False, Multiple Choice, Matching, Filling and Cross–Word items.

Next few years will bring a revolution concerning the educational process, linking the Knowledge Society with the Conscience Society. A forward step in our work will be the third generation of this software product: to adapt *SuperTest* at probabilistic vocabularies and evolutive text.

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