ADVANTAGES OF USING THE COMPUTER IN THE EDUCATIONAL PROCESS

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Abstract

The present study aims at highlighting the importance of using the computer in the instruction process. The use of the classical educational means cannot be eliminated, but they must be blended and combined with the utilities offered by the computer and the peripherals, which make teaching, learning and evaluation much easier.

The computerized society of recent years has compelled the use of computers in the teaching process. Computer-assisted instruction has become one of the basic teaching methods in the modern teaching process. The computer - the hardware component is used as technical support, and the software - the software component is used as informational support.

The computer facilitates the understanding of the new concepts that the learner finds harder to get closer to. This is particularly possible because it provides both visual and auditory support in learning and it also makes interactivity possible. The learner not only listens to the information s/he needs to keep in mind, but with the help of some educational software s/he has the opportunity to discover on his/ her own some aspects and to intervene in the learning process.

The computer used in learning helps enhance the information. Theoretical information is not enough for learning, and the learner needs situations in order to apply the knowledge s/he has learned. That is why most educational games contain a whole series of exercises where the learner defines his/ her knowledge.

Keywords: Computer; ICT (Information and Communication Technology); NICT (New Information and Communication Technologies); Internet; AeL (Advanced e-Learning).

1. Introduction

The means of education refer to the assembly of natural materials (objects from the surrounding reality in their natural form - minerals, plants, animals, appliances, machineries, installations, equipments, etc.) or intentionally made (models, charts, maps, questionnaires, tests, portfolios, laboratory facilities, sound laboratories, didactic games, didactic simulators, technical means of training, etc.) which support the achievement of the objectives of the educational activities (Ionescu, 2003, p. 249).

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There must be no confusion between the means of information (diskette, film, foil) and the technical devices presenting them (computer, projection device, overhead projector). The first belong to the teaching technology and the others to technique. That is why some authors distinguish between the teaching materials and the technical means of education. Joiţa *et al*. (2003) makes the following terminological distinctions: the means of education belong to the technical world (from chalk, book to computer), the teaching means in the functional sense belong to the teaching technology, having formative value and serving the educational process.

Other quasi-synonymous phrases: *intuitive material, learning material, media, new teaching technologies*.

The main functions of the instruction means are formative, motivational, informative, illustrative and demonstrative, and also of experimental, ergonomic and substitutive investigation, aesthetic evaluation, and of orientation of interests.

There are numerous classifications of the means of education, according to various criteria:

a) Based on the historical criterion (Ionescu, 2003):

Table no. 1. Classification of instruction means according to the historical criterion

Category of means	Examples of means of knowledge transfer	Description
1st Generation	Board, manuscripts, museum exhibits	They are directly used in the joint action of the teacher and students
2nd Generation	Print (Gutenberg), textbooks, printed texts	They determine a mediated action of the teacher through a code: writing
3rd Generation	Photography, reversal film, sound recordings, film and television	Inter-human communication takes place through machines
4th Generation	Modern Techniques, Training Machines	A machine-student dialogue is carried out
5th Generation	Computer	A student-computer dialogue is made
6th Generation	New Information and Communication Technologies (NICT): Internet Browsers	A direct dialogue computer - student – Internet is made

• the efforts of the teacher and students: maps, templates, didactic stamps, multiplication machines;

Means of assessment and evaluation of results: tests, examination machines, computers.

b) According to their objective nature (Bontaş, 1998):

• Natural - realia (actual and manufactured): collections of rocks, minerals, plants, insects, objects, parts, equipment;

• Of substitution - physical objects, imagistic, graphic, iconic, audio-visual displays;

• Logical - mathematical - concepts, judgments, symbols, formulas;

• Actional - laboratory work, applied models, computer science;

• Mixed - collections, guides, manuals;

• Informatics - software, databases;

• Of assessment of knowledge: oral, written, practical assessment patterns.

The updating of the educational means promotes pedagogical and didactic innovation. In what follows, we shall enumerate the domains and sub-domains that contribute to the modernization of educational means (Ionescu, 2003, p. 262):

Table no. 2. Domains and sub-domains that contribute to the modernization of educational means

Education sciences	Generations of educational means	Exact sciences
The Learning Mechanism - Classical Conditioning	1st Generation	Chemistry: paper, ink
The Mechanism of Learning - Instrumental Conditioning	2nd Generation	Physics, Mechanics: Printing, lithographs
Theories based on algorithmic or heuristic processing of information	3rd Generation	Physics, Optics: Photography, projected fixed images
Pedagogical programming, traditional techniques and modern techniques	4th Generation	Electronics: Movie, television, computers
Expert Systems	5th Generation	Artificial Intelligence
Accessing Multimedia Information on the Internet	6th Generation	Virtual Reality

Modern education cannot ignore the use of both classical and modern educational means.

2. The advantages of computer use in education

The computer is very useful to both the student and the teacher, but its use should lead to a qualitative improvement of the educational process, rather than hindering it. The computer should be used to pursue the acquisition of knowledge and the development of skills that enable the student to adapt to the requirements of a constantly evolving society. (Logofatu, Garabet, Voicu, Pausan, 2003; Cerghit, 1997).

Regarding the place of the computer in the teaching system, teachers have different attitudes, as follows:

1. The tendency to reject, in the name of traditional pedagogy, which can lead to retrograde parallel education;

2. The tendency to empower technical means to the detriment of teachers, imposing their multiple possibilities and constraints of shaping education;

3. The tendency to put the computer at the service of a pedagogy which is able to integrate it to a new school education project.

Nowadays, the computer is undoubtedly a beneficial means of teaching. We can rightly claim that it is a revolutionary teaching aid, impacting on the educational process to an extent that has never existed since the school textbooks appeared.

The main advantages of the computer used as an efficient learning tool are the following (Oprea, 2006; Roşca, 2002):

• The computer provides learning opportunities by playing;

• The computer facilitates the understanding of the new concepts that the student finds hard to grasp;

• The computer makes it possible to model and simulate phenomena that cannot be observed in reality;

• The computer facilitates problem solving;

• The computer helps reinforcement of information;

• Another advantage that computer learning offers is the ability to test and evaluate.

The computer should thus be regarded as an instrument in student education. It depends on each and every teacher and parent how they choose to use it and how they teach students to use it. Through computer lessons and educational games, teachers increase the students' interest in school because they stimulate their imagination and learning by discovery (UNESCO Institute for Lifelong Learning (UIL): Annual Report 2010, online, 27.06.2018).

3. From traditional technologies to New Training and Communication Technologies (NICT)

The traditional technologies of the learning process are not necessarily the only ones available for teaching and learning. Thus, José Joachin, a controversial writer, whose writings for the UNESCO publications have brought a point of view that is worth considering, states: "Until today, education has practically been a "low tech" business using the talking made by the professor, at a rate of 125-200 words per minute for several hours a day - and using, at the same time, the pencil, the chalk, the blackboard, the printed word, and the quite widely used in the entire world, the overhead projector. " (Brunner, 2001).

In any case, the new information technologies (NICT), especially the network technologies, have changed one of the basic axioms of school management: the isolation of the school in the same way as the one from the formal education system, the common or linear language text began to be replaced by the hypertext. Thus, there is transition to "high-tech" education, as Brunner points out, quoting Tapscott, in illustrating the lifelong learning technologies that have made him famous. In this illustration, we see how the transition from analog to digital technology shows the increased degree of control over learning that those technologies give to the student

(https://www.moodle.ro/preparandia/index.php/liceal7/item/468-utilizarea-calculatorului-in-procesul-educational-instruirea-asistata-de-calculator, online, 25.06.2018).

The use of the computer, regardless of its advantages, can also have a number of disadvantages. The computerized society of recent years has imposed the use of the computer in the educational process. Computer-assisted training has become one of the basic teaching methods in the modern teaching process. Computer-assisted education involves: teaching new knowledge communication lessons, applying, consolidating, systemizing new knowledge, automatically checking a lesson or group of lessons, automatically checking a school subject or a particular school curriculum. The computer - the hardware component is used as technical support, and the software - the software component is used as informational support (http://advancedelearning.com/index.php/articles/c311, online, 25.06.2018).

The so complex educational process is becoming today a stage for three actors: the teacher, the student and the computer, who jointly seek to ensure the success of the educational process. The teacher has changed role, as s/he is not the main actor who drives the whole teaching process any longer. In this context, the teacher becomes a facilitator, monitoring and evaluating the teaching and learning process, as s/he is not the main source of knowledge transfer anymore. It is not only the teacher who loses this main role. The textbook, which is no longer the basic information source, is being replaced by the information provided by the computer. The student has become a follower of the computer use in the teaching and learning process, especially in recent years. Student-centered learning becomes the basis for computer-assisted training
(http://advancedelearning.com/index.php/articles/c311, online, 25.06.2018).

The computer takes over many of the functions and tasks which traditionally belonged to the teacher. For example, the role of informant of the teacher will be downgraded. Moreover, the computer becomes a means of direct intervention in the organization of learning situations, taking over a series of tasks related to the organization of reinforcement, training, evaluation activities, and others which are easily transferable to the new technology. Or, the computer can perform a tutorial role, helping students to progress faster and with better results. The computer can thus be considered as a means of information, practice, simulation, application and consolidation of knowledge, particularly useful in the educational process.

However, computer-assisted training offers the teacher time and possibilities to use it by working more on organizing learning, structuring content, practicing student thinking, stimulating their creativity, aspects which have been often neglected so far. Admittedly, the teacher has more time to conduct research and solve the specific problems they face in the professional development process.

The teacher generally relies on four basic operations: defining the pedagogical objectives in accordance with the specific competencies, designing the activities by establishing strategies, applying methodology and ensuring the assessment of the teaching activity. Accordingly, when CAT is used, the teacher goes through the following stages

(Adăscăliţei, course book, source http://www.ee.tuiasi.ro/~aadascal/curs_iac/, online, 23.06. 2018):

- Establishing/ assessing the need for knowledge and skills.
- Determining the objectives/ targets to achieve in accordance with the

initial competencies of the student; the students will be informed about these goals and how to reach them. During the activities there is the possibility of defining new objectives, about which the students will also be informed.

- Relating to the knowledge to be acquired, the student is administered a diagnostic or placement test.
- Depending on the students' capacities, the means and activities to be carried out will be determined; there will also be established the teaching strategies to ensure the achievement of the objectives.
- Evaluation is carefully and systematically planned, aiming at the accumulation of knowledge related to the objectives already set. The assessment is based on clearly defined criteria, offering the possibility of objective assessment.
- The assessment of the training process is based on the evaluation of the data, as an absolutely necessary routine process. At the same stage, the materials and activities are reviewed, with correction of any possible errors occurring during training.

The main types of CAT (computer-assisted training) specific applications are (https://www.moodle.ro/preparandia/index.php/liceal7/item/468-utilizarea-calculatorului-in-procesul-educational-instruirea-asistata-de-calculator, online, 25.06.2018):

1. Guided tutorials or interactive lessons are made up of presentations and guides for presenting certain applications, with no practical exercises and no type of test applied. They are indicated in the presentation and guiding phase of the training activity. They are used to assimilate principles and rules, and to learn strategies to solve problems. Tutorials are especially used in learning computer applications: Microsoft Office, Adobe, Internet, for designing web pages, etc.

2. Practical exercises (drill and practice): they imply the students doing some practical tasks in order to apply their knowledge to solving practical problems or to acquire skills (for a certain profession, for example). There are practical exercises of the following types: common applications, design applications, execution applications, construction, production or manufacturing and creation. Emphasis is placed on the correctness of the execution and the principle of the progressive increase of the degree of difficulty is considered. Examples include applications in the technical field, computer science, and so on.

3. Simulations and experiments: simulation attempts to reproduce real phenomena, processes or situations. Students interact with the dedicated software in the same way an operator interacts with a real system in a simplified way. The simulation is based on the analogy with the real system. The simulations contain the initial presentation of the actual phenomenon, process or situation, they guide the student's activity, provide practical situations that the student needs to solve, and possibly attest the level of knowledge and skills the student possesses after

completing the training program. In this case, the examples are in the technical field, in physics, astronomy, chemistry, biology, and so on.

4. Training games: games are dominated by simulation activities; the student is faced with problem situations that he/ she needs to solve by means of rules and different ways of acting to achieve goals. During the game, the student must be able to correct himself/ herself when he/ she makes a mistakes, being warned about it. Such games can help students in learning foreign languages, basic math operations, and so on.

5. Pedagogical tests: are perhaps the most common category, either independent or as part of complex applications. Their specificity depends on several factors: the time of testing, the purpose of the test, the typology of the action (feed-back or not). There are a multitude of tests: initial tests applied at the beginning of a school cycle, school year, semester; tests applied after studying units or chapters; work or simulation tests; tests based on thinking or memorizing; tests with standardized or open answers, etc. a test must contain the purpose and set of knowledge to which it applies, the objectives of the test, the length of time it is applied, the display of results and errors with the correctness percentage. These tests can be applied to the vast majority of disciplines.

4. AeL - an innovative tool for education

AeL is a modern eLearning solution which offers management and presentation facilities of various types of educational content, such as multimedia interactive media, interactive guides, exercises, simulations and tests (TEHNE Centrul pentru dezvoltare și inovare în educație, 2004; Brut, 2006).

The AeL eLearning solution is based on modern educational principles and standards, being designed as a complementary tool to classical teaching/ learning methods. AeL provides support for all participants in the educational process (students, teachers, school principals, administrative staff, parents, civil society). AeL can be used successfully in teaching and learning, for testing and evaluation, for managing educational content and monitoring the results of the training and evaluation process (Siveco Romania, AeL Educational Events, http://www.advancedelearning.com/index.php/articles/c3, online23.06.2018).

Today, the AeL eLearning solution is implemented in over 15,000 schools across Europe, the Middle East, Africa and the CIS. The AeL eContent Library contains 3,700 interactive lessons, covering over 20 subjects and including over 16,000 individual learning moments.

AeL is optimized for:
* Synchronous learning - the teacher fully controls the educational process by creating, adapting and monitoring the learning environment;
* Asynchronous learning - study in the pupils' personal rhythm, collaborative projects;
* Testing and evaluation - to meet the needs of the educational institutions of measuring the impact and effectiveness of the teaching process.

More than 7 million users worldwide are currently using the AeL eLearning solution. Due to the quality and outstanding results achieved in improving the educational process, over time AeL has received prestigious awards at the international level:

In July 2009, Microsoft recognizes SIVECO Romania as the Partner of the Year for the Central and Eastern Europe Region and a world finalist for Advanced Infrastructure Solution, Windows Desktop Deployment category. Using the latest Microsoft technologies and techniques, SIVECO Romania has managed to implement one of the most complex and fastest software installations ever applied to improve the Romanian education system. In 2008, more than 10,000 schools in Romania were equipped with more than 100,000 computers, installed with the AeL eLearning solution, the Windows Vista operating system and other latest technologies (Siveco Romania, 2003).

SIVECO Romania has won the European IT Excellence Award 2008 in the Independent Software Vendors (ISV) - Vertical Market category, for its contribution to the implementation of the Computerization of Education Program in Romania. The quality of implementation and the impact of the SEI (Computerized Educational System) project were the main arguments by which SIVECO Romania succeeded in imposing itself within the European IT Excellence Awards 2008, gaining a new and important European award.

In June 2005, the AeL interactive lessons were designated as the best educational content in the world, in the prestigious digital content competition World Summit Award (WSA), organized by WSIS (World Summit for Information Society).

Through this recognition, Romania has become a reference name on the world map of computer-assisted education. SIVECO Romania has since become the first Romanian company to receive the 1st Prize in the eLearning section in a competition with other 168 projects from as many countries. By using AeL interactive lessons, millions of students in Romania and around the world have transformed the obligation of learning in the joy of discovering (Siveco Romania, 2003).

"AeL lessons are an excellent example of an innovative approach to eLearning. Digital materials can be used in various training environments and they cover a wide variety of subjects: Mathematics, Physics, Chemistry, History, Biology, Informatics, Geography and Technology. AeL provides the teacher flexibility and it is an exceptional tool that promotes the student-centered approach. They have a very clear, pleasant design that contributes significantly to understanding the concepts and phenomena presented. Rich in multimedia functionalities, AeL lessons are an example of good practice for the new trends in eLearning. "- The motivation of the WSA international jury.

In September 2004, the European Commission nominated the AeL eLearning solution for the European 1st Prize competition.

All these AeL recognitions come as a confirmation of the quality and efficiency of the solution for education. At the same time, the eLearning solutions offered by SIVECO Romania continue to improve by applying the most advanced

technologies, by following the latest standards in the field and respecting the requirements of the clients.

Conclusions

Due to the fast development of information technology, the computer has become an indispensable tool for anyone, an instrument through which we can access impressive sources of information thanks to the large number of existing websites, virtual libraries or online museums, an instrument with the help of which any person can keep in touch with family or friends and with which information can be obtained in a limited time and at minimal cost. However, we must also keep in mind that too much technology can be a serious threat to health and to a harmonious development of children.

Moreover, a long exposure to pre-established scenario-based games may affect creative and imaginative thinking as well as social skills. Western countries are constantly monitoring the phenomena by IT studies for various reasons: educational, informative, commercial, but also for predictive research which is so important in business. In Romania, however, the lack of information in this respect prevents IT training providers from making long-term predictions and may lead to unsubstantiated strategic decisions due to lack of information. (http://www.rasfoiesc.com/educatie/informatica/calculatoare/ROLUL-CALCULATORULUI-IN-VIATA-17.php, online 25.06.2018).

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