



Computer Aided Training - A Variable of the Modern Romanian Educational Process in the Knowledge Society

Bogdan-Vasile Cioruța^{1*} and Alexandru Luran²

¹*Technical University of Cluj-Napoca - North University Centre of Baia Mare, Office of Informatics, 62A Victor Babeș Street, 430083, Baia Mare, Romania.*

²*Technical University of Cluj-Napoca - North University Centre of Baia Mare, Faculty of Science, 76A Victoriei Street, 430122, Baia Mare, Romania.*

Authors' contributions

This work was carried out in collaboration between both authors. Author BVC designed the study, performed the literature searches and wrote the first draft of the manuscript. Author AL managed the analyses of the entire study. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJESS/2020/v13i430336

Editor(s):

(1) Dr. Sara Marelli, Scientific Institute and University Hospital IRCCS San Raffaele Ville Turro, Italy.

Reviewers:

(1) Caba Ioan Ladislau, Romania.

(2) Gabriel Julien, University of the West Indies, St. Augustine, Trinidad and Tobago.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/63629>

Review Article

Received 27 September 2020

Accepted 02 December 2020

Published 17 December 2020

ABSTRACT

Computer and multimedia learning is still an active teaching method. Computer-assisted and computer-based training allows an education based on the intellectual profile of the student and beyond. It also puts the student in situations of interaction and rapid communication, made in a favorable environment that allows massive dissemination of the created content and time flexibility by combining synchronous and asynchronous means of communication. In the case of computer-assisted instruction, the interactivity is practically generalized, providing the learner with permanent feedback, as visible and immediate effects occur on the computer screen. Today, computer-assisted instruction involves efficient research of the student's work, supervised and guided by the teacher (even in the current conditions dictated by the pandemic), which helps him in performing technical operations, in identifying the links between information and documentation, leading him to a new form of knowledge (digital knowledge). Achieving the objectives of the educational process

*Corresponding author: Email: bogdan.cioruta@staff.utcluj.ro;

requires as necessary, in different stages of learning, the intuition of processes and phenomena of reality, either directly or through substitutes. At the same time, the formation of skills and abilities requires the presence of material supports for practicing actions. Through this paper, we aim to show that there is thus a diversity in education such as "pedagogical tools" called associated teaching aids in the field of computer-assisted training. They contribute to the efficient development of the didactic activity, being equally material resources of the educational process, selected from reality, modified, or made to reach the pedagogical objectives. The progress of technology has driven the diversification and improvement of these resources, so that, in the Information and Knowledge Society, it can be shown that computer-assisted training has become a variable of the modern educational process, which must take into account, more than ever, the profile of the individual and society.

Keywords: Educational perspectives; e-learning; operational platforms; knowledge society.

1. INTRODUCTION

The society in which we live, as part of the Romanian education system, is an environment in a continuous dynamic (and it will always be so), with profound consequences on each individual; consequences determined by the permanent and accelerated rate of change [1,2]. Today's society lives above the level of the means at its disposal now. Contemporary man is forced, in this context, to live and develop in a fluid environment, with a dizzying dynamic, which often ends up being perceived as a hostile one [2,3]. A change of prime importance, perhaps the most important, is that of changing the nature of jobs; the transition to the Information Society and the Knowledge Society implies, first of all, mutations in the object of activities, mainly in the direction of collecting, storing, processing and protecting information. If until recently an individual had only one job in his lifetime, with a dynamic of change low enough to allow him to form a natural reflex of adaptation, today the jobs or the profile of the work performed changes on average every 3-5 years, in which case we are talking about a series of dramatic changes in the field of activity.

Lately, as a result of the facilities offered by the new IT&C, in all sectors of society and all aspects of the activities undertaken, phrases such as information society, information age, communication society, etc. have been imposed to designate the same reality [3], but from another perspective, a new existential reality in which access to information and the formation of an information culture prevail.

In today's society, defined by the new reality, the success and survival of many companies, many categories of institutions or individuals, with political or social responsibilities, depending on

their ability to locate, analyze and use information resources efficiently [4,5]. Also, if a few decades ago the education received during the school years could, in most cases, be sufficient for the rest of an individual's life, today the situation has changed dramatically. The individual must be prepared for a new lifestyle and training - lifelong learning (the phenomenon generated with these community changes) [6]. Man's survival as an individual may depend on his ability to learn, to retrain, to forget what he once learned, and to be instructed quite differently in the future. Under these conditions, during the initial training period, education must prepare the individual for this rate of change, create skills and abilities to adapt, and the training process itself must adapt to the new conditions [7]. The education of modern man must reach and exceed the stage of level-oriented education (limited in time) and be oriented towards continuous education, capable of preparing the individual wherever he is and unlimited in time.

2. MATERIALS AND METHODS

This paper started from the idea of highlighting computer-assisted training, which was in a certain period perceived as an unnecessary discipline. And this in the conditions in which the students, from the last 5-10 years, came to the wrong conclusion, that they would no longer need such a discipline, in the conditions in which they were born and raised with the computer. Such a wrong finding overshadowed the prospects for the educational activities and made teachers who teach the discipline question the usefulness of their work.

Through this paper, we have chosen to show that the work done by our colleagues (who came to teach at some point the discipline in question) in

shaping a response to the current requirements of students and society, was not in vain. Today, partly dictated by the pandemic, partly dictated by the rise of digitalization, computer-assisted training in all its forms is more than necessary. From distance lessons to assessments made exclusively through dedicated software, respectively from smart glasses tools that help solve problems through control and external consulting to applications in the range of artificial intelligence and home automation, you can see how the training assisted by computer regains its former role and importance. This paper is based on a series of analyzes and studies, as well as observations in the context of teaching the subject (computer-assisted instruction), made from the perspective of the teacher, including those who taught the subject. Various working scenarios were used, both in the face-to-face (onsite) and in the distance version (online), the development of the educational act, as well as the reception and analysis of feedback being from the relatively recent field - generations of students from the last 3-5 years.

A series of attitudes and aptitudes were followed, starting from the students' perception of the discipline (in the context in which it has an optional discipline regime, dedicated exclusively to those who follow the psycho-pedagogical module) and culminating with their abilities to solve a series of requirements. (some common sense, relative to the course of society). Through the requirements in question (from the realization of a CV to the design of an educational product applicable and adaptable to the classroom), we aimed to follow the way of adapting students to the topic of discussion, as well as meeting the requirements within the specified time. Although the analysis of observations and working scenarios is still ongoing, several conclusions could be drawn. Although in general, the discipline does not enjoy the appreciation of students, lately they have begun to feel more and more useful.

3. RESULTS AND DISCUSSION

3.1 Computer Aided Training Field of Education Sciences

The use of the computer in the educational process becomes a necessity in the conditions of the accelerated development of Information Technology. For the new generations of pupils and students, already accustomed to the avalanche of multimedia information - born and

raised with a tablet in hand (as presented in Fig. 1), the concept of assisting the learning process with the help of the computer is an intrinsic requirement. The computer is perceived in turn as a toy, then as a tool, and finally as an information resource. It has already become their daily habit to use the computer for communication, information, entertainment and, more rarely, even training.

Called by some scientists as "the most important technological innovation of modern pedagogy", computer-assisted training contributes to the efficiency of training, being a result of the gradual introduction of computerization in education [8]. We can thus consider two very important defining aspects of computer-assisted training:

- a) The student-computer interaction that allows the diversification of the didactic strategy, facilitating the student's access to ampler, more logically organized, and variously structured information, presented in different ways of visualization. It is not the computer itself as a physical object, even including a multimedia configuration, that produces immediate pedagogical effects, but the quality of the programs created and circulated properly, of the computer products, integrated according to methodical efficiency criteria in the training activities.

Educational institutions must adapt their classical methods and practices and find new teaching methods and procedures that will allow them to "produce" students with new skills: autonomy, flexibility, ability to cooperate, and specialized dialogue. They must also find ways to stimulate and promote self-learning and to maintain the balance between "individualism" and "socialization".

The methods of traditional education cannot cope with the avalanche of knowledge and this accentuated dispersion of qualifications, trades, and fields of activity, which are becoming more and more specialized, but paradoxically more interconnected.

- b) The apparent dilution of the teacher's role, so that his teaching experience is integrated into the active learning program - when applying the method, the teacher's presence is discreet but important in that he establishes the time and manner of application of the method, as an important alternative to classical methods.

Therefore, the method of training with the help of the computer does not diminish the role of the teacher in the training process, but adds new valences, creates new ways of professional expression.

Computer-assisted learning requires a rethinking and restructuring of the entire educational process (see Fig. 2), an intensification of research on cognitive psychology - the teacher must learn to think differently, to formulate his problems differently, to revise his concepts, to correlate his objectives, and to orient the entire methodical arsenal in the direction of eliminating routine intellectual activities [8]. In these conditions, as a science of education, pedagogy is attached to computer-assisted instruction, which studies the educational phenomenon in its essence, addressing both the features, purpose, and tasks of education, content, principles, methods, and forms of the educational process in axiological perspective, practically pursuing its continuous improvement.

From a certain perspective, the computer-assisted training is considered to be a method subsumed to pedagogy. Of course, computer-assisted learning can be considered as a way out of the arsenal of ways to approach the teaching-learning process. In reality, this is a distinct field in the system of pedagogical disciplines.

In this context, it is more than necessary to establish the reference objectives of the computer-assisted learning method:

- Mastering this method, as an alternative to the classical methods of teaching, learning, assessment;
- knowing the advantages and limitations of the computer-assisted learning method;
- identification of the situations of application of the method, in alternation with the classical methods;
- knowledge of educational software in the specialty of initial training;
- training the skills of using educational software in the training process;
- knowledge of research directions and guidelines at national and international level on the use of the computer-assisted learning method;
- knowledge of the principles of designing educational software;
- improving computer skills in the training process.

The integration of computer-assisted learning in the system of pedagogical disciplines, without it

being in any relationship of subordination to other disciplines, is accentuated by the requirement of interdisciplinarity in the design of learning programs. Computer-assisted training is linked as a discipline to research results in several fields such as child psychology, social psychology, human genetics, pedagogy, didactics, aesthetics and design, communication techniques and technologies, information technology, informatics (including part programming). The use of computers must lead man to emphasize his unique qualities, to his involvement and social interest through direct knowledge of socio-economic reality, which will make him more attached to society, more humane, more empathetic. Education must be rethought with the evolution of technologies on the one hand, and according to the requirements of society, on the other.

The task of research in the field of educational practices, especially those related to computer-assisted training, is to anticipate the moment of stalemate and to intuit and formulate the problems that are emerging on the socio-economic horizon, to build plausible hypotheses, to verify them experimentally and to find viable solutions for the present and future stage of knowledge and development of society.

3.2 The Relationship between Computer Aided Training and E-learning

Conceptually, computer-assisted instruction, and e-learning are close terms. Thus, there are several concepts especially in the Anglo-Saxon scientific space that argue that the two terms overlap, as other concepts argue that the scope of e-learning is broader and includes the scope of computer-assisted training. The most important element that differentiates between e-learning and computer-assisted training is individualization. Most of the time, Computer-Aided Training was focused on porting courses that were conducted traditionally (see Fig. 3), electronically, or on the Web, which further accentuated non-individualization.

Courses specially designed for e-learning solve this problem by leaving the individual responsible for managing their training. The essential features of e-learning (many of them common to computer-assisted instruction) are the following:

- learning to use the computer or other devices, Internet, interactive television, or satellite broadcasting;

- materials that support learning are produced and delivered on different devices or the Web, contain multimedia elements and online assessment methods;
- learning can be done either face to face (in the form of Computer Aided Training) or at a distance.
- e-learning includes a wide range of applications such as web-based learning, Computer Aided Training, virtual classroom, digital cooperation.
- e-learning allows learning "anywhere and anytime" in the sense of emphasizing the individualization of the learning activities.



Fig. 1. The development of the individual's profile through the use of technology

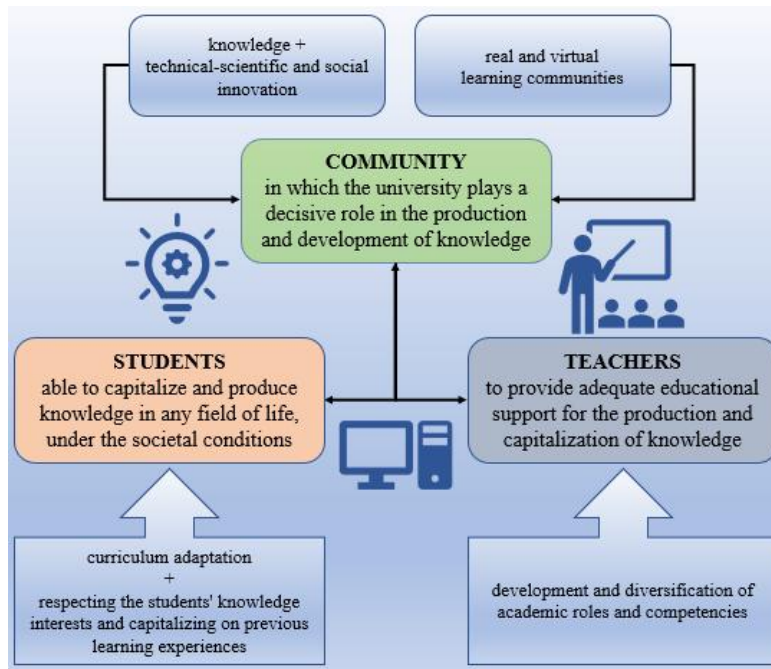


Fig. 2. View on computer-assisted training through the prism of the teachers-students-community relationship



Fig. 3. Traditional training vs. e-Learning vs. m-Learning

A limited Internet search finds a multitude of definitions next to the term e-learning: These definitions allow us to highlight some features currently associated with the term e-learning:

- a) Technological mediation - certainly the most important feature of e-learning refers to the use of information and communication technologies for content transmission, communication, and evaluation. These technological means include an extremely wide range of elements, from computers to mobile phones and satellite data transmission.
- b) The contribution of the Internet or the intranet (as a network of interconnected computers) In an overwhelming proportion, e-learning is related to the Internet, even if particular forms can be found that do not involve the Internet, such as telelearning. All activities associated with the training are carried out in the context of using computer networks.
- c) Distance and/or face-to-face interactions define a particular form of e-learning - Computer-Aided Training, a form that is increasingly popular in institutionalized educational contexts.
- d) Learning can be done individually - through computer-assisted learning has emerged an interesting and effective training method. If we refer to an e-learning in which the interactions are face-to-face, there are certain requirements for learning, which must be followed (a certain pace, enrollment in a program), elements that do not detract from the advantages of the method.

3.3 (Re)defining the Field of Computer-assisted Training in Relation to the Current Social Context

Computer-assisted training is a teaching method or a teaching method, which capitalizes on the principles of modeling and cyber analysis of training in the context of new information and communication technologies, characteristics of contemporary society [8]. Computer-assisted training refers to the theoretical-applied field of computer use in the learning activity. The Computer-Aided Training System is an integrated hardware-software environment designed for the interaction between the owners of a knowledge system and its recipients, to actively assimilate information and skills.

The first achievements in the field of computer-assisted instruction were more focused on learning through the verification of knowledge, later began to appear complex software to encourage the active construction of knowledge, to provide meaningful contexts for learning, to promote reflection, to free the student from routine activities and stimulate intellectual activity similar to that of adults in the production process. These elements have produced essential changes in the field of teaching, both in terms of quantity and quality.

A new framework for discussions at the confluence of technology and educational sciences was gradually delimited, generating various hypotheses and controversies, concepts, and methodologies. In this field of computer-assisted instruction can be found a series of interrelated concepts that try to describe a complex and constantly changing reality.

Computer-based education and assisted training are the most general terms and refer to any form of computer use in education, from teaching, practice, tutorials, simulation, to the creation and translation of electronic content, programming, etc. Both terms refer both to the actual computer-assisted training and the complementary activities of the teachers such as the preparation, elaboration, and administration of the didactic materials.

Of these, computer-assisted instruction is the most common term and is understood as referring to practice and application, tutorials, simulation activities, and any other type of activities that supplement and facilitate traditional, teacher-led learning.

Another component may be the management of instructional activity involves the use of computers by the staff of educational institutions, for data management of pupils, students or learners, and for making educational decisions or for other activities in which school performance is tested to optimize resources allocated to training.

If we look on the bright side, however, many teachers see this crisis (by reporting to the current suspension of the face-to-face courses), as an opportunity to learn new skills, learn more about them, and feel a great responsibility to be with their students [9], and guide them through this difficult period, which they can only do by using computer-assisted training.

Teachers thus have the freedom to design the lesson, proving creativity, but the most effective way is the situation where teachers work together [10], to develop plans, to develop common ideas about how to teach, to stimulate interest, and ensure progress.

4. CONCLUSION

The school and academic environment, even in Romania, must keep up with technology, understand and anticipate the impact on the current way of learning. Computers have been incorporated into educational programs by giving those who have trained greater freedom and flexibility as well as individuality in the classroom. The use of the Internet by students was an idea that caught on quickly. The natural affinity between students and the Internet has given rise to several student-oriented projects, initiated by students, led by students.

Learning that emphasizes student participation is a type of instruction that gives the student an active role in the learning process. Students, active participants, print their rhythm and strategies. The way of learning is individualized, not standardized. The pedagogical modernization of the school thus means the existence of hardware equipment, software (programs), and their ability to adapt, receive, and capitalize in the instructional environment. From the perspective of computer-assisted training, some central notions must be taken into account that can be found in the educational activities carried out with the support of the computer. The most important of these are:

- The hardware that represents the totality of the material elements that compose the physical substrate of the used technology, respectively the computers with all the peripherals that make possible the physical and sensory interaction with the human user (keyboard, printers, scanners, video projectors, etc);
- The Internet that represents a global network of computers, connected through direct or mediated links, a network that allows communication with learning partners or specialists, and access to virtual libraries.
- The software that represents the totality of the instructions and the ways of interrelating the man with the machine materialized in the so-called programs.

- Educational software which is a program product specially designed to be used in the learning process. It can also be found under the name of courseware which is a larger package that includes educational software, the necessary documentation (methodical indications and description of the type of hardware on which it can be implemented), and possibly other material resources (worksheets, proposed exercises, etc.). The general features of the educational software refer to (i) its educational purpose, (ii) to ensure an easy interaction between the individual and the computer, and (iii) its adaptation according to the user characteristics.

As already mentioned, several broad categories of educational software can be distinguished: interactive applications (interactive lessons), educational games played on the computer, multimedia presentations (teaching with the help of a computer), productive multimedia systems (realization of common projects such as electronic portfolios), postal and multimedia communication systems, video conferencing systems, respectively various multimedia products and services, which come to reshape the personality of the individual and to restructure the response to current problems of society.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Anonymous. Computer Aided Training (general course), Faculty of Psychology and Educational Sciences, "Alexandru Ioan Cuza" University of Iasi, 2010; Accessed on 10.09.2020. Available: www.psih.uaic.ro/.../postuniv/12-13/IAC_curs_General.pdf
2. Lesenciuc A., Communication theories, "Henri Coandă" Air Force Academy Publishing House, ed. a II-a, Braşov; 2017.
3. Cioruța B., Coman M., A forey in modern scientific research of the environment. From EISs to Environmental Informatics, Journal of Environmental Research and Protection (ECOTERRA®), Babeş-Bolya University from Cluj-Napoca. 2011;8(29): 17-20.

- Available: www.ecoterra-online.ro/files/1330955124.pdf. Romanian.
4. Cioruța B., Cioruța A., Coman M., Pleading for an environmental informatic culture forming need, Journal of Environmental Research and Protection (ECOTERRA®), Babeș-Bolyai University from Cluj-Napoca, 2012;9(30):31-39.
Available: www.ecoterra-online.ro/files/1339069625.pdf. Romanian.
5. Cioruța B, Coman M, Cioruța A, GeoGebra software - a new possibility for studying the environmental problematics?, Journal of Environmental Research and Protection (ECOTERRA®), Babeș-Bolyai University from Cluj-Napoca. 2012;9(30): 40-47.
Available: www.ecoterra-online.ro/files/1339069750.pdf
6. Vasluianu S.E., The evolution of the teaching-learning-evaluation process, EDICT - Revista educației, Liceul Pedagogic Matei Basarab, Slobozia (Ialomița); 2020.
Accessed on 11.09.2020
Available: <https://edict.ro/evolutia-procesului-de-predare-invatare-evaluare>. Romanian.
7. Anonymous. Issues of the institutional system and the educational process, Department for teacher training, University of Medicine and Pharmacy of Craiova; 2009.
Accessed on 10.09.2020
Available: www.umfcv.ro/files. Romanian
8. Moisa N.C., Computer Aided Training, EDICT - Revista educației, Colegiul, Grigore Antipa”, Bacău; 2018.
Accessed on 15.09.2020
Available: <https://edict.ro/instruire-asistata-de-calculator>. Romanian
9. Popescu Z.G., Romanian education and the challenges in the online environment, EDICT - Revista educației, Grădinița cu Program Normal nr. 3, Slatina (Olt); 2020.
Accessed on 11.09.2020
Available: <https://edict.ro/invatamantul-romanes-c-si-provocarile-din-mediul-online>. Romanian
10. Safta MA. The role of feedback in ensuring school progress, EDICT - Revista educației, Școala Gimnazială Tudor Vladimirescu, Târgoviște (Dâmbovița); 2019.
Accessed on 11.09.2020
Available: <https://edict.ro/rolul-feedbackului-in-asigurarea-progresului-scolar>. Romanian.

© 2020 Cioruța and Luran; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

*The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/63629>*