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Assessing the role of new information and communication technologies (I.C.T.) in the potentiation of the didactical methodologies applied in the study of biological disciplines

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Abstract

Scientific research on assessing the role of new Information and Communication Technologies (I.C.T.) in the potentiation of the didactical methodologies applied in the study of biological disciplines has taken place over several years of research, from 2006 to the present. Have been identificate functions and ways of implementing them in teaching biological sciences, such as electronics simulations and modeling, computer presentations, use of the Internet, the whole range of multimedia techniques. Have been discovered advantages and limitations / disadvantages of using information and communication techniques applied in teaching biology and efficiency solutions in the application of these teaching techniques.

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Keywords: Information and Communication Technologies; teaching biological sciences; Computer-Assisted Instruction (C.A.I.); Electronic Brainstorming (E.B.S.); PowerPoint; multimedia techniques; internet;

1. Paper Rationale

The beginning of the first century of the third millennium is marked by a Knowledge Society, about that spoken and the World Report 2005 of United Nations Educational, Scientific and Cultural Organization (U.N.E.S.C.O.) that addresses the definition, content and future of knowledge societies. “Every society has its own knowledge

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assets. It is therefore necessary to work towards connecting the forms of knowledge that societies already possess and the new forms of development, acquisition and spread of knowledge valued by the knowledge economy model. The idea of the information society is based on technological breakthroughs.” (U.N.E.S.C.O., 2005) What is needed first is the extraordinary dynamism of cognition, and thus dynamism of culture, and inevitably, the development of education. Through the transmission of a part of the social-historical experience of mankind, the values of science, the education assumes the noble mission to uplift the theoretical edifice of human being in the making. It is an education that tends to focus obviously on: “...the four pillars that are the foundations of education - learning to be, learning to know, learning to do and learning to live together...” (Delors, 1996), as provided in Report of U.N.E.S.C.O. Commission in 1996.

In Knowledge Society promoted in European Union, “Taking European Knowledge Society Seriously” (European Commission, 2007), it is necessary to assess the role of new information and communication technologies in the potentiation of the didactical methodologies at biological disciplines, to increase the level of competences of pupils/students. The information and communication techniques are contemporary and have attracted interest to both for their application, but and interest of research of their, including the application of the research in didactics, as in the teaching of biological sciences. Thus, my scientific research has taken place over several years of research in teaching, from 2006 to the present time and will possibly develop in the future. For example, between 2009-2010, in the scientific research “The Methodology of implementation of European key competences in the curriculum applied at biological disciplines” as an associate researcher at the Institute of Education Sciences of Bucharest, we have found correlative approaches between European key competences in science and technologies applied in biology and areas of key skills in the use of new information and new communication technologies.

The purpose of this research is assessing the role of new I.C.T. in the study of biological disciplines, based on functions and their modalities of application, finding of advantages and of disadvantages and limits of using I.C.T., electronic learning at biological disciplines as well as solutions to overcome them, so as to achieve the potentiation of the didactical methodologies applied in the study of biological disciplines.

2. Paper theoretical foundation and related literature

“Various forms of knowledge and culture always enter into the building of any society, including those strongly influenced by scientific progress and modern technology. It would be inadmissible to envisage the information and communication revolution leading-through a narrow, fatalistic technological determinism-to a single possible form of society.” (U.N.E.S.C.O., 2005). In the Knowledge Society the process of communication is also changing. “This is due to the fact that, the communication is based on digitized, cross-linked interaction and binary communication. In addition, it focuses on the Internet and networks, for that it is still spontaneous, unorganized and diversified in terms of objectives and membership.” (Castells, 2007). Informatics represents the totality of techniques with which are tight, is recorded, selected and modified various informations automatically and in a very short time. In 1981, the International Business Machines (I.B.M.) Corporation created Personal Computer (P.C.), the first mass produced microcomputer. Computers work with programs (software) that constitute their active intelligence. Text editing programs are used to write and correct the texts. Due to the graphics programs it's possible to draw on the screen, to put photos and texts on the page, to retouch images and so on. “In the field of communication, the combinations of techniques date back to the early stages of these instrument...but the links between telecommunications and data will appear since the birth of computer science.” (Flichy, 1999). The invention of computer-specific devices in informatics is very important for present and future of process educational, being a means of modern education, effective in organization of teaching, the computer-assisted instruction (C.A.I.) being a method of streamlining of the learning and teaching at numerous educational disciplines including at Biology. But an important role in the application of information and communication techniques it have teachers who should have the necessary skills in this area. “...the general lack of computer skills of teachers is the single largest barrier to the spread of ICT-based learning in schools...In universities, many, if not most, teachers and administrators do have these skills, and, as a result we do find that teaching, research and administration have been much more generally affected by the information revolution than primary and secondary schools.” (Carnoy, 2005). Computer-assisted instruction or insertion technology “is a teaching method that leverages the principles of modeling and analysis of cyber training activity in the use of information and communication technologies characteristic for contemporary society.”

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