Educational Environments using Technology

By Georgios Besas & Georgios Giannoukos

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EDUCATIONALENVIRONMENTSUSINGTECHNOLOGY

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I. Introduction

An educational software of the CAL method is considered to be one with which the learner imports and studies, while the centre of attention is the computer and each material. One should to pay attention to the role of the teacher and not neglect by any means, since the teacher sometimes undertakes the role of the organiser in the whole procedure, as well. Particularly significant for Hubbard (1996) is the interplay between people and technology, which finally defines the methodology of this specific field.

A lot of these systems are based on the Instructional Design, which has its roots in the behaviouristic theory. Instructional Design was considered to be a reliable process for the preparation of teaching programs for a long time. It consists five stages, which are:

- Analysis of the target group and its needs
- Subject design
- Teaching material development
- Implementation
- Evaluation and return to the first stage

As we continue in our work we will analyze some of these teaching systems which were implemented with the Instructional Design.

II. Categorization of the Educational Material

An educational material is defined as the product of technology which aims at the teaching of a Cognitive subject by lending a specific pedagogic philosophy and educational strategy. This software can benefit both the teaching and the learning of the language.

Schreck and Schreck (1991) have mentioned some of the software programs that are used in CAL method, such as Tutorial, Drill & Practice, the software for the text editors, the simulation software and the educational games, the multimedia software, etc. The first applications of CAL method, such as the software of guidance and the software of training and practice are based on the behaviouristic period. The text editor software, the simulation software and the educational games depend on the framework of the communicative period. Finally, the multimedia software is based on the framework which Warschauer (1996) calls combinational, and depends on two technological breakthroughs, the Internet and the multimedia.

The term ''educational software'' implies that the computer is used as a supportive means of teaching. In a large degree, it takes the ''what'' of the education for granted and it is interested in the ''how''. Such a fact, however, even though it was previously true, is not in effect anymore. ICTs add new data in the teaching (for instance, writing on the computer is different from writing by hand, the text composition process for the Internet, just like the text composition for Power Point is not the same as the traditional process, etc). Consequently, we could say that the extensive use of ICTs as means of writing or reading creates new data for the context of the education itself.

a) Guidance software

They goal of the presentation of information and the learner's guidance is to achieve a learning outcome. A basic characteristic of this type of educational software is the effort for individualisation of learning (taking for granted that every learner has different abilities and follows his/her own training course). The most crucial characteristic of this software is the presentation of information as facts or rules on a computer screen - with or without the use of multimedia (that is to say pictures, sounds and video) - and the questioning of this information with prefabricated answers. In their current form, guidance systems are organised with the form of multimedia (by using plenty of presentation forms of the information), while offering a predetermined course of learning by guiding the student. The following circle of ''interplays '' between the educational software and the learner-user govern their architectural structure which, according to Warschauer (2000), is the following:

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- presentation of a piece of information (which has to do with a certain content, usually of limited extent, with clear educational goals)
- question (on the system's provided information)
- answer (to the posed question) with given the demand to use this information when the learner responds to similar questions
- evaluation /estimation (of the trainee's answer, based on the teaching targets) and decision-making, concerning the quality of the provided answers.

b) Software of training and practice

The initial educational software were characterised as shown above. The quite limited computer memory and the simple design of these programs was the reason of their premature appearance. These applications, according to Schreck and Schreck (1991), provide the learners with the possibility to practice in a curriculum which they have already been taught. Unlike the guidance programs which offer a complete circle of teaching (use of multiple information forms, such as texts, sounds, videos, pictures, and cartoons), training and practicing programs have a different target group, since they concern learners/users, who are already familiar to some degree with the teaching subject. In other words, they do not aim at providing new information, but they control the knowledge that has already been acquired.

The use of behaviouristic software, such as guidance systems and training and practicing systems is intentional and useful in many aspects of the educational process, mainly when it is combined with software of different types. The expected answers in a program of exercise and practical application are often quite simple and many times the only thing they require is merely the push of a button (perhaps the answer is random). The analyses of the answers from the system are also elementary and they provide instant feedback, usually in the form of ''true or false''. It is mentioned that these programs are based on Skinner's (1961) points of view, who believed that a simple machine is capable to replace the teacher, since it can offer a stable mechanism for the reinforcement of behaviour (behaviourism). Also, the behaviouristic school of thought considered it very important that the curriculum could be given in different units and it was able to be acquired gradually, giving the student the comfort of time. This perception was connected with the constructivist teaching

prototype. Thus, the emphasis was given on the teaching of microstructure subjects.

c) Software of general use

i. Text editor

Text editor is a unique software category which is used for the digital production, modification, paging and communication of a text. On a conceptual level, text editor constitutes a new writing method, which differs in quality from handwriting. The evaluation of the text editor has been suggested by Piper (1987), who has stated some advantages concerning the characteristics and the operations of this particular software. As far as the software is concerned, Piper (1987) initially refers to the fact that all computers have been installed at least one text editor, thus allowing the learner to take advantage of the available equipment. Another advantage has to do with the learner's facility over the basic skills of the text editor, under the condition of course that the teachers are already familiar with them.

ii. Excel

Excel is a software application which has to do with the organisation, the modification and the presentation of mostly numerical data. They constitute then, a rather convenient way of computer modelling of data and information. A computerised model contains data and processing rules. In other words, the use of Excel emphasises the way of calculating and not the data itself. The user of the Excel program is able to set suppositions and control them with the data introduction or by modifying the already existing data. Excel is a powerful tool for the creation of quantitative calculating models. With the aid of the models, the user creates scenarios and s/he then simulates them. Excel, in this occasion, becomes a valuable tool for decision making.

iii. Power point

Considering the facility of their use and teaching, these tools are widely used for oral presentations which address a classroom or an audience. Their use is widespread at universities for the support of different lessons that is within the framework of a pedagogic transmission of the knowledge. Gradually, the use of power point systems is becoming more common in the lower levels of education as well, since it is the easiest way to use the computer. Power Point systems are used mainly by the learners for presentations (visualization) and constitute a multimedia and a hypermedia tool. When learners create hypermedia, they develop their work management skills, organization and designing skills, survey skills, reflection and presentation skills. In this respect, hypermedias are powerful cognitive tools, available to the learners for the reinforcement and the development of their educational structures. The creation of hypermedia encourages the use of multiple ways of presentation (via pictures, sounds, movement and video), unlike the traditional way

of education which is characterized by the speech-centralism and the emphasis which is given on the written and oral speech.

iv. *Simulation software and educational games*

We use the term "simulation" to refer to the technique of imitation of a system's behaviour from another system, which takes imminent place at the educational applications of ICTs. That is to say that simulation is a presentation or a model which has been created in order to represent and allow the understanding of a system's operation. There are programs which give various roles to the participants such as the journalist, archaeologist etc, and through their participation they become familiar with the respective scientific terminology. The trainee who plays the role of the journalist, for example, follows orders by the newspaper he works for in order to accomplish a mission. During this mission he needs to find and verify some further information, and as a result he is naturally led to use some sources (e-encyclopaedias, databases). These programs can become really impressive with the use of multimedia (sound, stable and moving picture and text). One of the advantages of this type of educational software is the fact that they encourage team work and survey, they develop the critical ability and they lead to the acquisition of knowledge in a natural and pleasant manner.

Educational electronic games are games that encourage the growth of logical thinking and the acquisition of skills and knowledge in a fun way. They are based on parts of knowledge which users have to apply in order to achieve the suggested goals. From the first surveys that have been made over the use of the games in education (Gordon, 1970), it turned out that they constitute a source of motivation for the users in order to test their knowledge, to develop them by applying them, and to learn facts that they are not familiar with, while entertaining themselves at the same time (Malone, 1980).

v. *Web 3D environments: "Second Life" example*

Virtual environments date back at the beginning of the 1970's, when the adventure and the simulation games appeared, and they had the form of text-only simulation, in which the user could communicate with the computer by typing orders on the keyboard. Today, with the arrival of the web 3D environments, such as "Second Life", we are talking about a very interesting technology which has plenty of possibilities to offer. This technology can be used both in the teaching and learning process, and a lot of educational organisations have already incorporated it in their teaching program. The users of "Second Life", known as "Residents", interact with each other via moving avatars (digital representations of themselves). The users/ "residents" of the virtual world are able to discover the world, meet other residents, take part in individual and group activities, create and commercialise various objects (virtual property) and services, etc. Moreover, as "Second Life" provides its "residents" with lots of communication opportunities via text messages, chats and voice, the basic linguistic skills (reading, writing, speaking and listening) can be practiced together with the data collection, such as the linguistic types, dialogues, elements of intercultural communication.

As can be easily seen, by attributing a more interactive and communicative dimension to the learning experience, "Second Life" offers a lot of advantages to the teachers. The learners are able to communicate with other people (either complete strangers or friends and colleagues) in a 3D environment of their choice. Before the design of activities and the student's entry in the "Second Life" environment, the teacher has to consider and answer certain questions, such as which the targets of the teaching intervention are, what kind of activities should be used for the accomplishment of these targets, how the activities and the learning will be evaluated, what kind of issues may occur etc. Web ED environments play a more and more important role in education. As is the case with every new technology, "Second Life" adds a greater value in the teaching process when it is used in combination with other means, either inside or outside the Internet. While the World Wide Web offers those who learn a great amount of information, "Second Life" adds a synchronous, social and communicative dimension, completing the learning and teaching process from a distance.

vi. *Multimedia software*

Usually, multimedia software have to do with an educational software in CD-ROM form or on the Internet, which provides an environment with the basic characteristics of the hypermedia structure, the possibility of information access in multiple ways and the interplay with the user. A multimedia environment is structured by the use of information of different types, such as: text, picture, graphics, sound, video, animation etc. Moreover, it may be enriched with simulations or elements of virtual reality. Multimedia software is significantly superior to that of the later phases of CAL. For this reason they belong to the last phase of CAL; software of this type target the management, development and use of every type of information which is able to be stored in digital form: numbers, texts, pictures, sound and video. In the simple multimedia forms, the user does not have control of the system, and the presentation of the facts has a linear or serial form, just like in the traditional books. That is, a simple multimedia application is an e-book, i.e. the presentation of a book in digital form, enriched with sound, pictures and video. However, multimedia software, despite their obvious advantages in the teaching process according to the previous software of CAL, have failed to contribute their full potential so far.

This has happened mainly because of certain issues in the quality of the programs and the teachers' weakness to take advantage of their capabilities. According to Warschauer and Kern (2000), it is difficult for the multimedia material to create a genuine environment and it does not provide interaction of an adequate level either.

III. THE INTERNET

The rapid growth of the Internet has significant consequences; not only in the way the access to the computing material is provided, but also in the way the communication with other people takes place. By exploiting the services of the Internet, the learners have access to a large amount of any kind of data, such as texts, pictures, graphics, sounds and videos. The Internet facilitates communication and the exchange of views between people who are located in different geographical regions. This happens through the exchange of e-mails, the distance cooperation via video conferences or the participation in chat groups with common interests. The Internet's most basic applications which are most frequently mentioned are: the use of the Internet for browsing and information search, for communication - as an electronic learning environment - and, finally, its use as an evaluation tool. One must definitely point out that the aforementioned applications are used in balance in this research. E-mails, the World Wide Web, blogs and "Skype", are only a few Internet services which are incorporated in the educational process and they are becoming valuable tools for the implementation of the educational programs. In later ports of this research each one of them is being analyzed separately, by presenting their educational contribution and the ways in which they can be exploited during the learning process.

With the development and expansion of the Internet, new technologies are being dynamically incorporated in the education service, and more specifically in the e-learning. This education method uses the Internet as a means of distribution of the educational material (it provides the possibility of access and re-use of crucial and modern information sources and educational material, without the limitation of space and time). Tele-learning is being analyzed in a following chapter, as it has a significant contribution in this field. Below, we are going to analyze some of the most important uses of the Internet, present the role that each one of them plays on the way it operates and evaluates the learning and teaching process. A lot of researchers mention that the use of the Internet is able to liberate the teaching and learning from the natural boundaries of the schoolroom. According to this point of view, the Internet has the potential to transform the way the teachers teach and the learners learn. The most important benefits of the use of Internet services in the educational process are identified below:

- Learning becomes an active process for the students, as they have the possibility to process the information.
- Students build the knowledge by themselves, by participating in activities of information search and processing.
- Cooperative teaching is facilitated and so is group work. Learning has an interactive nature, in order to promote a high level of learning, through the exchange of views and conversation.
- Learners can have the control of the learning process and they have the chance to decide on their goals with the teacher's guidance.

IV. WORLD WIDE WEB

One of the most widespread uses of the Internet nowadays, is its use for search of information. The World Wide Web is the most well-known and widespread Internet service. In this application, the computing material is structured with the hypermedia form. This means that the web contains - apart from texts (hypertext form) -, pictures, audio documents, moving picture documents, videos etc, as well as generally every type of multimedia, with links between the parts of this material. These informative components of the web (texts and multimedia), are located in different nodes on the Internet, anywhere in the world. Moreover, in order for the connection between all the distributed computing material to be made, various links can be found throughout the whole part, which refer to some other parts of the material in the World Wide Web. To be more exact, we could describe the World Wide Web as a large service, in which information is being transmitted continuously. Browsing through the World Wide Web is considered to be a procedure which is defined by very interesting practices as, through this browsing, different forms of learning are promoted.

a) Communicative applications of computers

Computer Mediated Communication programs constitute a new dimension of communication, while at the same time they can be sources of genuine information, appropriate for teaching. Computer and Internet communication tools can be divided in two categories: those of the first generation network and those of the second generation network. The first category comprises e-mails, forums and chats, which allow the asynchronous and synchronized communication (see chapter 3). In the second case we have blogs and wikis.

b) E-mail

The E-mail is a form of written communication with time difference; that is to say that it is belongs to asynchronous communication. The E-mail allows the exchange of messages (and the sending of archives) among Internet users. It should be noted that when the

e-mail message exchange concerns subjects of specific interest and it is carried out only between some particular groups of users , then the so-called 'mailing lists' are formed. As far as the educational aspect of the e-mail is concerned, it is mainly used for the skills development of the production and the comprehension of the learners' written skills.

c) Internet relay chat

Internet Relay Chat is one of the most popular applications which can be used for communication in real time, i.e. to provide synchronous communication. It gives people the possibility to communicate via text, speech talk and video. With regard to its educational value, Mynard (2002) has presented the benefits of chatting forums in the learning:

- learners communicate in a genuine communication environment with natural speakers in real time
- they are asked to participate actively and develop their skills, such as their interactive ability and their autonomy.

However, there are certain limitations, especially if the learners are not able to type and read fast. In addition, the learners may come across abbreviations and street language, which they may not be able to recognize.

d) Tandems

Communication which takes place via E-mail and Chat lies with great success in the networks we call 'tandem'. Tandem is a method, according to which, two students from different ethnical backgrounds meet in order to help each other in the learning and in order to exchange information on the culture of each other's country. More specifically, it is a "give and take" process in which someone is a teacher of his/her native language and the learner of a foreign one. What is more, this method has addressed adults since it began. The ways through which there can be communication via a tandem are two. The first one is through personal contact of the two participants (face to face tandem). The second one, which is directly connected with this work, is the e-tandem which promotes the contact via an asynchronous written communication, in other words an e-mail (e-mail tandem). The e-mail tandem usually requires that the participants resort to the production of written language, which has a result the production of written texts in the target language, this way creating genuine environments for the language learning process. An improvement of the e-mail tandem is the chat tandem, which allows the use of a web camera, as well. The access to organised tandem programs is made by educational institutions, as an educational environment has to be formed. A crucial point which is worth mentioning is the fact that participants have to be placed in the appropriate groups. The gathering of all participants is made by the completion of a request

form in which, apart from the native language and the target language of each participant, further information is provided concerning the level of the target language, the skills they desire to practice, their interests etc.

One of the most widespread tandems is the eTandem Europa, which "is a program that is financially based on the European Union in the context of the European year of languages in 2001. The goal of this program is to make clear to, as many European citizens as possible, the possibility of learning foreign languages via eTandem, and facilitate their incorporation in this program". The tandem method basically constitutes a distance-learning form (e-learning), and it has to do with learning environments where the participants communicate in a tandem, by exchanging messages on the Internet. Before the learners'/participants' incorporation in this system, auxiliary notes are provided concerning the way they have to organise their lesson and the way they evaluate and correct their partner. Additionally, they are provided with material, such as dictionaries and auxiliary linguistic material, in a language which is common between the two.

e) Skype

Skype is a platform for online conversations, in which a feature called 'Skype casts' allows the user to take part in online chats, with maximum 100 participants. Skype has an index where the conversations in language learning can be found, or participants can have a conversation like this by themselves. Abroad and especially in the USA, many teachers have already incorporated the use of Skype in their teaching, and more specifically Skype Education.

f) Blog

Another communication possibility which the Internet provides is the blog. The term "blog" comes from "weblog" and it refers to a webpage which is constantly refreshed, adding new columns (entries), which are put in a linear row, so that the newest entry is on the top part of the blog. Blogs have particular characteristics which make the online editions extremely effective and flexible. These characteristics are:

- easy blog creation
- text entry in a linear row
- photo post, video post etc.
- connection with other websites and blogs
- social network creation

Blogs have to do not only with text archives. In reality they can include all data forms, such as hyperlinks, graphics, presentations, RSS and – most interestingly for language teachers – audio and video archives. The use of blogs has tremendous potential in the education process. For instance, the learner could choose a blog and study it. Parallel to this, s/he could complete specific exercises given by the teacher, which are relevant to the blog's content. In the final stage of

the assignment, the learner could make an oral presentation of his blog.

Another possibility could be the creation of a blog by the learners themselves. This procedure requires the teacher's active participation, since s/he will have to evaluate the learners' effort, providing comments. Of course, in this case, it would be preferable for the teacher to provide some evaluation criteria from the beginning, such as the context, the language which is going to be used etc.

g) Web Quest

Web Quest is an activity, in which the learners respond to questions and they process the information which is located on the World Wide Web. Web Quests have been designed to focus on the use and analysis of information, and not on the search itself. This means that the teacher and/or the constructor provide the student with the links needed. The Web Quest model was developed in the beginning of 1995 at San Diego State University. The main issues with the use of the Web Quest method concerning the less frequently taught languages are: the language level of websites (usually it is too high), and the fact that, for some languages, there is still very little content available on the Internet. There are different categories of Web Quests according to Dodge (2002), the most significant of which are divided in the categories below: narration, composition, mystery, journalism, design, self-awareness, crisis, analytical, scientific, persuasion, development of common understanding etc. These Web Quests could also be of long term, which promote the development of understanding, and they could be of short term, which generally promote the cognitive development.

The structure of a Web Quest, which has as its base the exploratory activities, is worth discussing. The structure of a Web Quest according to Dodge (1997) is as follows:

- Introduction: the introduction informs the learners about the WebQest's context. It tries to motivate them by assigning them a mission, or giving them a specific role.
- Goal: at this point, the result the learners will have to achieve is described. The WebQuets's goal may be different each time, and it may have, for example, the form of an issue that needs to be solved, a point of view which needs to be supported with arguments, the design of a product, and generally anything that has to do with the collection and processing of information.
- Procedure: in this part the steps and the method which have to be followed by the participants in order to achieve the goal of their Web Quest are presented. The techniques they are going to follow are also mentioned, for example how the information will be organized, where it will be collected etc.

- Evaluation: at this point it is described how the learners' procedure and result are going to be evaluated, and the means of their evaluation is defined.
- Conclusion: having completed the Web Quest's purpose, they are given guidelines for interplay, along with some further activities. Moreover, at this point, learners self-evaluate their effort.
- Material: the material and the reports that had to do with the procedure are collected. There has to be certainly a web material, otherwise there will be no difference from a simple lesson plan.

From the above mentioned, we conclude that Web Quests constitute a first-class implementation procedure of the web sources in the educational practice. This is the case because they contribute positively to the learners' exploratory activities development.

h) Podcasts

Podcasting is a method of multimedia archives distributed via the Internet, by using "RSS" formats. This allows the user to reproduce these archives in any personal computer or mobile phone device. There are also more ways of multimedia distributing on the Internet, but in these instances podcasting has special features, including the use of syndication. This means that users can register to an area which produces podcasts and receive updates automatically, whenever a podcast is available. Such an example is EPN, which has managed to gather podcasts that concern various topics. These podcasts are available not only to the teachers, but also to the learners.

i) Wikis

The word "wiki", which is used to signify "very fast" in the Hawaiian dialect, allows the quick creation and update of a webpage, using the wiki technology. By this, we mean the software that is needed for the creation of a website, which allows any user to locate digital material and information on the Internet. A main characteristic of these websites is the option "edit this page", while they allow the:

- easy creation
- collaboration
- save of the changes
- connection with other websites
- creation of social networks.

In Wikis, every user is able to process, add and delete material which exists on the website. Today, there are various Wikis, the most well-known and widespread of which is Wikipedia. The term "Wikipedia" refers to an e-encyclopedia, which is available in different languages, and anyone can contribute to its composition. There are also the "teachers Wikis", i.e. websites which have to do with the teaching, and they are encyclopedias with terms and examples.

j) Hot Potatoes

The software suite "Hot Potatoes" is a system for the creation of online educational exercises: short-answer, multiple-choice, gap-filling, crosswords, marching, etc. "Hot Potatoes" includes five applications which can create exercises for the World Wide Web. These applications are "JCloze", "JCross", "JMatch", "JMix" and "JQuiz". There is also a sixth application which is called "Masher", which gathers all the exercises of Hot Potatoes in one. All you have to do is fill in your data – text, questions, answers etc -, and these programs will automatically create the websites for you. "Hot Potatoes" is not free software, but it is free for users who are publicly-funded, for non-governmental users and teachers who have their WebPages free on the Internet.

V. EVALUATION OF INTERNET EDUCATIONAL SOURCES

In the teaching process, the Internet is proved to be a valuable tool and a source of creative stimuli for the teachers who are looking for new resources for their lesson. According to Kasper (2002), the Internet constitutes a highly effective means for the development of academic literacy. In order to evaluate a webpage, one must consider the following noteworthy points:

- The reliability of the webpage's content.
- Whether there is the possibility to control the information provided.
- Whether the access to the suggested webpage shows delays or errors.
- Whether we can foresee a possibility of humiliation from the webpage's material (stable website, rapid change of the website's data etc.). When it was created and how often it is updated.
- Whether the presented information is as objective and complete as possible.
- Whether there are advertisements and the intention of promotion for the products or services.
- Whether the creator(s) have the potential and certification for this purpose.
- Whether the goals are clear (information, education, entertainment, communication).

VI. CONCLUSIONS

Taking into consideration what has been discussed so far, one can comprehend that the Internet and the software provided via the Internet, are the most basic tools for a teacher. The continuous development of the Internet and the variety of its content, leads the user and the teacher to a constant development and acquaintance with a wide range of educational material, which is presented in different and interesting ways. In the learning process of a foreign language with the use of the Internet, a crucial advantage is the learner's exposition to genuine material and situations of communication. It becomes evident therefore that the extent and the evaluation of the effectiveness of the existed material by the teachers make their training for that purpose necessary. This means that above all, the teacher should be in a position to evaluate the educational sources available. Warschauer and Healy (1998) state that the changes brought about by technology with regard to teaching are connected with the new social and economic parameters, which have been established in the Western world. Technology is being used more and more frequently in the teaching process by adults. Internet platforms have developed significantly over the last years, and they promise to offer more and more useful, achievable and accessible applications, as well as tools for the language learning process. On the other hand, there are certain obstacles in the C.I.T. incorporation in the learning and teaching process, mainly for reasons that have to do not only with the teachers' education, but also with the material that is used.

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