Using informational technologies in teaching history of printing to chemical engineering students

Simona POPA*

Abstract: The traditional teaching methods cannot handle the huge amount of information that exists in present days. Although the personal influence of the teacher remains determinant in class, the using of modern technologies represents a necessity in educational process. The paper covers some aspects regarding the development a seminar of History of printing to chemical engineering students, using modern informational technologies in teaching.

Keywords: informational technologies, teaching, learning, history of printing

Introduction

In the context of contemporary society based on knowledge and taking into account that human capital plays a key role in it, the education is to be reconsidered by raising investment in educational and instruction areas. The access to information and knowledge is not the only aspect that matter in the informational society, but also the generation of new knowledge counts. Education becomes a process in which students learn how to learn, how to access new information, how to analyze and exploit it and, in the end, how to transform it into a new knowledge. All the opportunities provided by the new informational technologies, especially those based on the internet, must be exploited because they play a significant part in students education. Promoting the access to information is a strong step to develop knowledge, to facilitate learning, to enrich the quality of the educational process.

Theoretical and practical knowledge

According to **Agnes Erich** (2012) information is considered to be a very important resource in every activity domain. The changes in the educational process occur in order to counterbalance the rapid rise of informational necessities. The educational domain has to be adapted to the new trends of globalization and diversity of the technological environment: learning at distance, access to virtual libraries, development of individual abilities in using information. The new educational technologies are a direct consequence of the psycho pedagogical methods evolution in education as well as the new IT technologies. The didactic methods suffered transformation in time: from the printed

* University Politehnica Timişoara

books, to the video learning, or to the interactive multimedia information. Actual educational systems differ from the classic ones by some characteristics: active and participative methods, promoting individual work and creativity, stimulating cooperation and dialogue, moving the accent from teaching to learning and developing personalities of the students.

The instruction by using computers has a unique characteristics that differ from other teaching methods: interactivity, precision of the operation, capacity of presenting multiple and dynamic presentations, and can interact differently with each student. (**Burlacu Catalina** - 2006). The teaching process has to be modified, teachers have to think differently regarding the cognitive psychology. The didactic communication is mainly about understanding, the teacher having the role to organize and personalize the information.

The diversity and the high quantity and quality of documentation may affect the process of searching the information (**Porumbeanu Octavia-Luciana** - 2002), so the consequence is to educate the users, the teachers' role becoming more complex and more important.

The access to new information is not the only aspect that matter in the informational society, but the generation of new knowledge and its transfer also is important. Education suffer essential changes, becoming a process in which students learn how to learn, how to access, how to analyze, how to use information and how to transform it into new knowledge. All opportunities brought by new technologies must be exploited, especially those of the internet, because they play a significant role in educational process. (**Porumbeanu Octavia-Luciana** - 2004)

According to **Marcu Vasile** and **Marinescu Mariana** the education for the new technology and progress is to be regarded as a metamorphose of the traditional education. The computer became the indispensable support for modernizing education. The restructuration of education includes: the introduction of new types of education; the existence of an equilibrium between the accumulating learning and the innovative one; the progressive impose of new educational paradigms principles; the extension of the learning act to the entire life of the individual; an optimum balance among formal education, nonformal education and informal education; and the equivalence between working and learning processes. As a method of using the new technologies is the creation of specific educational modules, of special chapters respectively, in the traditional disciplines.

"The changes in educational field seem to pass through the change of teachers' perceptions. The teachers' training and their active participation in the procedures of introducing innovations combined with the encouragement for rethinking in their teaching reality seem to constitute important tools for the change in their perception. Teachers are in need of continuous training to increase their knowledge and understanding to be able to deal with the new demands. Their initial education and training is not adequate for them to confront successfully the changing social and technological changes and also the change in knowledge, analytical programmes and in teaching-pedagogic

approaches. Today teachers' training and lifelong learning are considered as some of the most important parameters for school effectiveness as well as for the renewing and reforming of the teaching systems." (**Panagiotis Giavrimis** - 2011)

Problematic issues and method

The integration of informational and communicational technologies in the teaching-learning-evaluating process facilitates the presentation process of information, its processing by the students, and the construction of knowledge. The new techniques may be: images, sounds, animation, and off course hypermedia technologies that facilitate *navigation* among different types of data.

The use of the computer leads to a more flexible teaching system. The integration of informational and communicational technologies into the teaching-learning-evaluating process is not only about exclusive usage for information purpose, but the teacher helps students to work alone, he stimulates their thinking capacity. One must learn attitudes and behaviors of educators for explaining the importance of informatics technology.

The Web site is a new powerful instrument that facilitate the learning process. It provides access to scientific information included in databases, online libraries, museums, etc. The students may interact with the researchers in the field, may communicate ideas, may exchange information and resources through e-mail, chat, video-conferences, etc. Teachers may organize virtual trips in research centers, museums, that are approachable only through internet.

Informational and communicational technologies that may be frequently used in class are *presentations* - they are descriptive materials, including imagines, diagrams. The application that can be used is ***Microsoft PowerPoint***

It used to be that students primarily used textbooks and other non-fiction books to learn their subjects. With informatics technology, they have other avenues for success. You may have a student who decides to do a Power Point presentation on the life of an important person in history rather than an essay.

One of the oldest teaching method is to dictate and students to write the notions, but they are students of certain age, not elementary school pupils. So, in my opinion, the informational and communicational technologies may be efficiently applied in teaching to students. The History of printing is an interesting subject, ant if the teaching of it is performed by the old teaching method, it can be very boring. Communicating with students during the class, asking questions by both sides can make the hours more interesting and efficient. Students love not to "sleep" in class, but to debate the subjects in question.

The Microsoft PowerPoint may be used in teaching The history of printing. The slides contain some aspects regarding specific important data that list some memorable facts, such as [**7**]:

"Modern printing started in the fifteenth century with the invention of the printing press by Gutenberg. Obviously other interesting things happened before that time.

- *3000 BC and earlier* - The Mesopotamians use round cylinder seals for rolling an impress of images onto clay tablets. In other early societies in China and Egypt small stamps are used to print on cloth. These stamps are gradually replaced by larger wooden blocks. In China such woodblocks are used to print on silk. The earliest known examples consist of flowers printed in three colors. They are likely produced during the Han dynasty (before 220 BC).

- *131 BC* - The first **Acta Diurna** (Latin for 'Daily Acts') appear. These are daily official notices in the Roman Empire and can be considered the first 'newspaper'. The notices are carved on stone or metal, they do not get printed. Scribes sometimes do make copies to be sent to the provinces.

- *Second century 105 –* A Chinese man named Ts'ai Lun is credited with inventing **paper**. He takes the inner bark of a mulberry tree and bamboo fibers, mixes them with water, and pounds them with a wooden tool. This mixture is poured onto a flat piece of coarsely woven cloth and let the dry, leaving only the fibers on the cloth. From China the knowledge of paper making is passed along to Korea, Samark Baghdad and Damascus.

- *Seventh century* - 687 – A small book containing the text of the Gospel of John in Latin is added to the grave of Saint Cuthbert. In 1104 it is recovered from his coffin in Durham Cathedral, Britain. The **Cuthbert Gospel** is currently the oldest European book still in existence. Some photos may also be presented, such as:

- *Eight century - 751 –* During the Battle of Talas, near Samarkand, the secret of paper production is made known to the Islamic world, as some of the Chinese prisoners are paper makers.

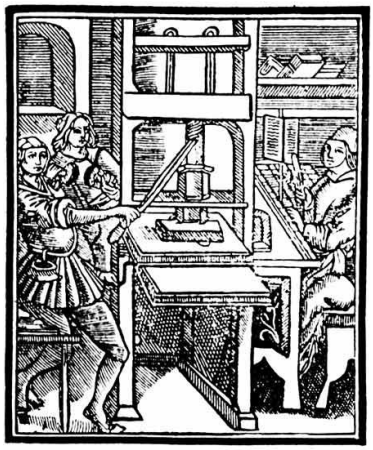
- *Ninth century* - 868 – A copy of the Chinese version of **The Diamond Sūtra** (or Diamond Cutter of Perfect Wisdom) is the earliest surviving example of a printed book. It is produced using woodcut, a relief printing technique in which text and images are carved into the surface of a block of wood. The printing parts remain level with the surface while the non-printing parts are removed, typically with a knife or chisel. The wood block is then inked and the substrate pressed against the wooden block.

- *Tenth century* - Arabs create a finer sheet of paper by substituting linen fibers for wood and bamboo. During the Shang Dynasty the Chinese invent **screen printing**.

- *1436* - Gutenberg begins work on a printing press. It takes him 4 years to finish his wooden press which uses movable metal type. The image below shows a press from that era. It uses relief printing: at the bottom left a frame holds the columns of text that get printed. This type consists of individual letters set in lead. After inking the type, a sheet of paper is put on top. Next the frame is shoved to the right underneath the platen. By moving the large handle pressure is applied to make sure the ink is transferred to the paper. Afterwards the bed is moved back to its original position and the paper can be removed.

Gutenberg sets up a printing shop. Among his first publications are the **'*Poem of the Last Judgment*'** and the **'*Calendar for 1448*'**. Gutenberg begins printing bibles. The first edition has 40 lines per page. A later 42-line version

comes in two volumes. Ironically enough Gutenberg goes bankrupt in 1455, when his investor **Johann Faust** forecloses on the mortgage used to finance the building of the press. Faust gets hold of the printing equipment as well as the 200 copies of the bible that have already been printed. While trying to sell them in Paris Faust tries to keep the printing process a secret and pretends the bibles are hand copied. It is noticed that the volumes resemble each other and Faust is charged with witchcraft. He has to confess his scheme to to avoid prosecution.



- 1457 - The first known color printing is used in *'**Mainz Psalter**'*, a book containing a collection of psalms. It is printed by Johann Faust and his son-in-law Peter Schoffer. Then **Albrecht Pfister** prints the first illustrated book called *'Edelstein'* which features a number of woodcuts. The *'Biblia Pauperum'* is issued in Bamberg and contains many **handcolored illustrations**."

During the presentation, students may ask questions, may present what they have been reading regarding the specific aspect.

At the end of the presentation the students are encouraged to look for new information on the web sites. In order to be evaluated they have to elaborate a paper regarding this issue and they must present it in front of the class at the end of the semester.

Conclusion

Because the educational domain has to be adapted to the new trends of globalization and diversity of the technological environment, the new educational technologies are a direct consequence of the psycho pedagogical methods evolution in education as well as the new IT technologies. The didactic methods suffered transformation in time: from the printed books, to the video learning, or to the interactive multimedia information.

Interactivity, precision of the operation, capacity of presenting multiple and dynamic presentations are some of the characteristics of the informational and communicational technologies, and they can interact differently with each student.

Using the IT technologies made more of the students interested in the discussed issues. They interacted with each other, and working in groups at seminars determines active involvement in practical activities.

During teaching using IT Technologies it can be observed that the students are more attentive in class. They may ask questions regarding the presented issue; they can come with novelties, found by using these modern facilities.

It may also be observed an active involvement in practical activities of students for activities at school, in class, and preparing the homework for seminars with these modern approaches. They present an increased interest in finding new solutions for learning performance. More of the students received good exam results.

It may also be mentioned that some of the students were not totally involved in these activities; they just waited for their colleagues to work and to obtain results that they may use. So, at some level, the IT instruments are not entirely welcome.

But the use of the computer leads to a more flexible teaching system, more of interested students, capable to learn more in school and at home. That is why in teaching History of printing modern techniques may be used. Students may use the new facilities to have more information, easily to access, and they can realize very interesting papers in order to be evaluated.

References

Burlacu C., Educaţia şi folosirea tehnologiilor informatice în comunicare, Conferinţa Naţională de Invăţământ Virtual, ediţia a IV-a (2006) 339-346; http://fmi.unibuc.ro/cniv/2006/disc/cniv/documente/pdf/sectiuneaD/7_50_burlacu.pdf

Erich A., Popescu C., Cultura informaţiei - o nouă abordare în sprijinul dezvoltării abilităţilor didactice, Studii de biblioteconomie şi ştiinţa informării 16 (2012) 126-132; http://www.lisr.ro/16-erich.pdf

Marcu V. Marinescu M., Implementarea tehnologiilor în educaţie sau educaţia tehnologică, Resurse pentru furnizorii de educaţie, www.1educat.ro; http://www.1educat.ro/resurse/software_educational/tehnologii_in_educatie.pdf

Panagiotis G., Adamantios P., Efthymios V., Adamos A., Informatics and communication technologies (ICT) and in-service teachers' training, Review of the European Studies 3 (2011) 2-12; www.ccsenet.org/res;

Porumbeanu O.L., Educaţia utilizatorilor pentru cultura informaţiei, ABIR 13 (2002) 14-19; http://abr.org.ro/www.abr.org.ro/BD%20full%20text%20Buletin%20ABIR/229.pdf

Porumbeanu O.L., Educaţia în societatea informaţională, ABIR (2004) 129-132; http://www.lisr.ro/11-porumbeanu.pdf http://www.ccsenet.org/journal/index.php/res/article/viewFile/9636/7608

*** http://www.prepressure.com/printing/history