TRADITIONAL AND IT SUPPORTED WAY OF LEARNING

PhD Vladimir Matić, Director of Vocational Schools Vukovar, Croatia

vladimir.matic@vu.t-com.hr

Abstract: Traditional education involves teaching environment that is based on the classic lecture. The main aim of such education is acknowledge transfer from teacher to students, while the teacher is the source of knowledge and the student is the passive recipient. Traditional education is losing its significance, which is caused by development of modern information technology. In traditional education, organization and management of the educational process are entrusted to the teacher. The teacher is responsible for educational activities and is the backbone of the educational process. In contrast, computer supported learning makes it possible to eliminate a number of weaknesses of traditional classes, such as the lack of productivity and efficiency, insufficient practical application of acquired knowledge and skills, lack of teaching and learning adaptation to individual students' abilities and lack of motivation to learn, receptivity of classical education dominated by verbal methods, lack of efficient monitoring of the knowledge assimilation course, etc.

Key words: learning, teaching, computer, information technology

1. INTRODUCTION

The educational process is systematically organized joint activity of teachers and students in accomplishing the tasks of education (Bognar, Matijević, 2005). In the literature, instead of educational process, the term **teaching** is quite often used. Except for teaching activities, it, of course, includes a variety of extracurricular activities. When we talk about teaching activities, it is good to point out that they can be divided according to various criteria. For example, according to the criteria of *obligation* there is a distinction between **required (regular)** on one side, and **elective** and **optional** on the other. Regular classes are organized for all students.

Elective classes are oriented towards the students' learning interests in certain disciplines (e.g. computer science). This form of teaching is characterized by two elements. The first is the free choice of subjects from which the students wants to acquire new knowledge according to their own preferences, and the other is a mandatory class attendance. Unlike elective classes, optional are characterized by incomparably smaller degree of obligation and it is possible for student to decide whether he wants to participate in this type of learning.

According to *place*, it is possible to distinguish between those in the classroom, outside the classroom and distance learning.

Classroom teaching can take place in the classic (universal) classrooms, which can be used for holding one or more subjects, and in so called specialized classrooms, which are adapted to the specifics of teaching certain subjects (e.g. IT classroom). Outdoor classes, as the name itself implies, is teaching and learning outside the classroom (e.g. in the schoolyard or in the nature), but also in any other place where it is possible to achieve a pre-defined educational task.

Distance learning, of course, is the most modern form of teaching that is achieved by using highly sophisticated information and communication technologies (TV, the Internet, etc.).

According to *duration*, it is possible to distinguish between classes where only one educational content (e.g. biology) is carried out over a long period of time, and then moving on to another subject. In literature, this form of learning is usually called teaching periods. Another form of distance learning is a

so called course teaching, where some content or activity is realized in reduced form. In other words, it is teaching taking place through a relatively short period of time. In addition to these forms of teaching according to duration, there is so called microteaching characterized by intensive work on knowledge or skills acquisition in a short period of time.

Important factors in the educational process are **extracurricular activities**. They can be held *in school* or *out of school*. The group of school extracurricular activities includes those activities held in school in students' free time. Most often there are free activities such as 'sections' (young chemists, young information scientists), student unions, recreation, etc. When it comes to out of school extracurricular activities, those are mostly activities in various cultural and sports clubs, and activities organized by school, and can be conducted outside of school. These are different competitions, productive and volunteer work, summer and winter holidays, etc. The structure of the educational process is shown in Figure 1.

Figure 1. The structure of educational process¹

The main subjects of educational process are **students**, **teachers** and **parents**. In vocational schools, role of teachers also have craftsmen and students perform their apprenticeship with them.

Educational process is there for *students*. A student is every person that learns. There can be primary school students, high school students or college and university students. Exceptionally, for students in vocational schools, who are taught by

apprenticeship model, the name apprentice is used. Adults who attend any of the adult education schools are called attendees. Without active participation of students in all stages of educational process, education is not possible.

Organization and management of the educational process are entrusted to the *teacher*. The teacher is responsible for educational activities and is the backbone of educational process. When teacher, as a person who is qualified for the knowledge transfer to students, appeared, it also influenced the appearance of **school**. Appearance of school, which is characterized by specific internal organization, influenced the appearance of science of teaching – **didactics**².

Important factors in the educational process are *parents* and *families* students live in. Parents can make a significant contribution in the preparation and implementation of the educational process, and their comments can have a significant impact on the evaluation of the educational process. Family as the primary social community has an important role in forming the minds of students, because it is a community with a complex set of functions, primarily educational.

Basic stages of this process are **agreement**, **realization** and **evaluation**³, and can be viewed from an educational standpoint. In the context of an educational standpoint, it is all about *biological*, *social* and *self-actualization* needs. However, when we talk in the context of the educational point of view, it is good to point out that *cognitive*, *experiential* and *psychomotor* learning is possible. In both cases, the process takes place through a variety of social forms, using appropriate *strategies*, *methods* and *procedures*.

Also, an important factor in the educational process is **external evaluation**, which has the feedback effect on the

¹ Source: <http://ladislav-bognar.net/drupal/node/76>

² Didactics is a scientific discipline which deals with the theory of education (Greek didasko – I teach, train)

³ According to B. Bloom (1970) evaluation is assesment of educational process (French évaluation – to asses the value)

programme (curriculum) in which *aims, tasks, contents* and *activities* of education are contained. In order to make educational process effective, certain conditions must be satisfied, the most important being *ecology*⁴, *media*⁵, *communication*⁶ and *climate*⁷.

2. COMPUTER AS A LEARNING TOOL

The appearance of computers represents a major challenge for those who seek modernization of the educational process and in introduction of innovative elements into it in order to raise the overall quality of the educational work at a higher level.

Computers, as a means of communication between teachers and students, are extremely convenient thanks to their outstanding technological, cybernetic, informational and didactic character.

Intensive research on possibilities of computer application in teaching began in the sixties, when the third generation of these devices developed. In this period, they were used only as a means of conducting so-called programmed classes. Later, however, this form of computer application loses its significance because it is suppressed by *computer simulation* that provides teachers new opportunities, particularly in regard to the development of creative thinking and creativity among students.

Computer simulation basically involves the process of imitation (simulation) of certain laws, phenomena or events using a computer. In teaching it is both the source and

intermediary in data and information transfer, and its didactic function may be different, such as exercise, motivation, etc.

The basis of computer simulation is a particular predetermined mathematical and/or formal-logical model which the simulation algorithm is based on. In selecting the content you need to choose those courses that can be programmed because programming is a part of computer simulations. Also, content that students have less knowledge about should be chosen because it is the only way to determine the effectiveness of the conducted experiment.

Computers have been getting new roles in teaching process since the Internet appeared. Information from all areas of students' interests became available, and the Internet also offers the possibility of *distance learning/education*.

Distance learning is education accessible to students who are physically remote from teachers or sources of information, and it often involves the use of new information and communication technologies and new interactive methods.

New voice and image real-time sharing ICTs complement and enrich the distance learning system because they enable the realization of a long present idea of creating a *virtual classrooms*⁸.

It is possible to create such learning environment different from the traditional classroom by using videoconferencing, and it has all the advantages of distance learning.

3. THE INTERNET AS A LEARNING TOOL

The Internet is a global network of interconnected computer networks in the world. It appeared in the sixties and it became more important with the discovery of the World Wide Web by Tim Bernes Lee in 1989 in Switzerland, which allowed browsing of

⁴ In didactics, the term 'ecology' is used as a synonym for the space where educational process is held (classroom, library, schoolyard, manufacturing sites, etc.)

⁵ Media is a means for information transfer [lat. Medius – means of knowledge transfer (speech, Tv, the Internet, etc.)]

⁶ Communication is an interaction between two people inanimate source for information transmission (lat. communicare – to say something to someone)

⁷ Climate is synonymous with the conditions governing the educational process. We distinguish between social and emotional climate. Social climate implies a relationship between teachers and students, and emotional climate is a sense of comfort and discomfort that occurs whith students and teachers intraditional classes with a tendency to overcome unpleasant emotions.

⁸ In didactics, the term 'virtual classroom' (lat. virtus – atrenght, power) is used as a synonym for the classroom in which, through the use of new technologies and videoconferencing systems, it is possible to make the audio and video transfer remotely in real time.

data and information stored on computers in the Internet system. Its appearance created new possibilities for computer use in teaching. It is an integral part of IT supported contemporary teaching.

Traditional form of teaching is characterized by a model consisting of one teacher and a large number of students. Although it is still the most common, many studies came to a conclusion that it is one of the most inefficient models. In this model, students are not motivated to actively participate in teaching process because attention is not focused on learning.

The appearance of the Internet and multimedia system development influenced the increase of intensive research aiming at improvement of teaching process by applying new ITs. Compared to the traditional way of learning, the use of the Internet in the classroom provides an individual approach to learning. In other words, this means that each student works on one computer, which significantly affects their motivation and activity in learning process. The use of computers and other ITs in teaching can convert 'classical' lecture into an individual research [9].

Of course, this type of learning allows the separation of students and teachers is physical sense (they do not have to be in the same classroom), as well as the use of educational media that connect them. The use of multimedia systems in the classroom at the same time enables the presentation of educational content remotely.

4. DISTANCE LEARNING

Distance learning (education) implies a process in which students are physically separated from the teacher or source of information. The programs used for this type of learning had been created before the appearance and usage of the Internet, even before computers. At the very beginning of distance learning development, media such as

printed documents, audio and video tapes, and TV programmes were used, and magnetic media (floppy, CD) after the computer appeared.

Distance learning took a new dimension when the Internet appeared and computer networks developed, and the two became its inseparable elements. This is the reason that in the literature the concept of distance learning is being increasingly replaced by the term *online learning*.

The main advantages of such learning are:

- The possibility of individual choice of learning space and ITs to acquire new knowledge
- The ability to adapt the work pace of learning to individual students' abilities
- The possibility of individual choice of teaching content student shows interest about.

The main disadvantages of such learning are:

- The absence of direct contact between teachers and students
- A relatively high level of students giving up
- Students must have a compatible IT knowledge which greatly increases the price of the learning process.

Distance learning programmes can be divided into several groups. The most common are correspondence courses, radio and TV courses, teleconferencing and videoconferencing, the use of computers and computer networks with the special emphasis on the Internet.

New technologies for real time voice and image sharing enabled the realization of a long present idea of creating a **virtual classroom**, which is the most advanced model of distance learning. The usage of videoconferencing systems makes it possible to achieve almost identical education as in the

classical classroom because the communication is fully *synchronous* or real-time. This communication can be *one-way* or *two-way* and it takes place between two or more spatially separated users.

5. MULTIMEDIA IN TEACHING

In attempts to categorize **teaching media**⁹ we encounter in the literature, it is possible to conclude that most authors are trying to categorize them according to senses relevant for their usage. Most often they are classified into three categories:

- Visual
- Auditory
- Audiovisual.

There is also a category of media difficult to be classified into any of the above categories due to its significant traits. These are computers and language laboratories that some authors call *cyber technology*. The Internet is also included.

The quality of teaching process depends greatly on the degree of media present in the classroom. Successful presentation of an event, phenomenon or process is better if a larger number of media is used than traditional lecture. That is why such classes are called **multimedia**.

6. OTHER EXAMPLES OF IT

Well-designed multimedia class, besides computers and the Internet, include other IT such as **the media without projection, projection media, audio and video media and devices**.

- **Media without projection** – intermediaries in information transmission through real objects, printed materials, models of

chalkboards and flip boards, and field trip.

- **Projection media** – media used in information transmission through projection (transparencies, slides, filmstrip, digital photography).
- **Audio and video media** – media used in information transmission through sounds and images (cassettes, CDs).

It goes without saying that information transmission through these media must include the use of appropriate technical equipment. Indispensable devices of every well-equipped multimedia classroom are overhead projector, slide projector, movie projector, TLP projector, LCD projector, overhead projector with LCD panel, tape recorder, cassette player, VCR, etc.).

Figure 2. LCD projector, OHP, slide projector 35mm¹⁰

Recently, a number of new devices which can be used as IT support in the classroom have appeared on the market. We will mention only a few: flexo-camera, interactive electronic whiteboard, webcam, digital camera and digital video camera.

Flexo-camera (micro camera) is mainly used in the teaching of biology and chemistry, and it can show even the smallest details on the TV screen or LCD projector. It allows a direct playback of pictures and charts from textbooks which, in many ways, improves the quality of teaching and it shortens preparation time for lessons. In addition, by using a special adapter, it can be connected to the microscope and a magnified image can be seen on the LCD projector or TV screen.

⁹ Lat. medium – means for knowledge transfer, source of information

¹⁰ Source: <http://www.educa.ba/avnastava.php>

Figure 3. Flexo-camera (micro-camera)¹¹
and interactive electronic whiteboard¹²

An important part of classroom IT support is also an *interactive electronic whiteboard*. In the combination with MIMIO Xi technology, an ordinary whiteboard for markers becomes interactive. Instead of the ordinary markers, electronic ones are used to write text which can be then stored in the computer's memory and reused when necessary. Text, which one can add images and charts to, and text from other programmes can be written in 48 colours and can be projected using an LCD projector or TV screen.

Of course, modern multimedia teaching is inconceivable without webcams, camcorders and high quality digital cameras. These devices are not intended for teaching material screening, teachers use them for making materials.

In most cases, even though it is not a rule, the best teaching material used in multimedia teaching are made in schools. In order to make such materials, teachers of different specialities (vocation professor, pedagogue, sociologist, etc.) participate.

Figure 4. Webcam, camcorders and high
quality¹³ digital cameras

7. CONCLUSION

An important influence on the development of education throughout the history of mankind have had technological breakthroughs that can be applied in the teaching process and thus make it more efficient. The beginning of 20th century was marked by the application of modern ICT and traditional teaching gradually loses its original significance.

Traditional and multimedia education comparison has brought to a conclusion that multimedia education offers far better opportunities than traditional education. Certain event, phenomenon or process is far easier to describe by using the appropriate audio visual recording combined with classic lecture than lecture alone.

This is especially applied to the use of computers and modern IT in education (IT support). Today, there is quality software on the market, unfortunately, only for some subjects and educational content which manufacturers deliver as multimedia interactive CDs for learning. Such software is usually designed for independent learning.

Sequences are presented in the form of modules and the students adjust the speed of presentation by themselves. Also, a student is able to answer questions that have multiple answers, and there is a possibility of branching programs to provide an additional clarification or repetition of questions. After answering all the questions, the student gets the information whether the answer is correct or not, or how many points is scored in relation to the total number.

At the end of the sequence, depending on the number of correct answers and the total number of points, one of the following messages is printed:

¹¹ Source: <http://www.educa.ba/avnastava.php>

¹² Source: <http://www.educa.ba/avnastava.php>

¹³ camcorders and high quality digital cameras

- Excellent, your knowledge is amazing; you have completely mastered the material
- Good, your knowledge is sufficient; it is necessary to repeat the content
- Bad, your knowledge is not satisfactory; you have to invest a lot more effort.

Such educational software is in the function of teacher-tutor, and there are two levels of **interaction** between student and a computer:

- Linear and
- Nonlinear.

Linear type of interaction involves browsing the menu by students, selection of one of the available teaching units and exit after the chosen material is learned. This type of interaction is most often encountered in the use of educational software in a variety of courses, but it is not rare even in a modern school.

Nonlinear type of interaction is characterized by the ability to access and read the required text, even articles from the press. Using the mouse and scroll bar, one can quickly and easily come to various definitions, interpretations, and similar, usually insufficiently clear and systemized when written on the paper (books, manuals, etc.).

IT supported education, as opposed to traditional education, contributes to:

- Increasing the students' motivation in the teaching process
- Reducing the time for learning
- A greater degree of memorizing acquired teaching content

- Greater productivity
- Respect for a wide range of individual abilities and working pace of students
- Possibility of measuring the learning process and the evaluation of the results achieved in the learning process.

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