A discussion about the use of Information and Communication Technologies in the teacher education: The experience of CEFET-MA

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Abstract: This paper presents a discussion about the use of Information and Communication Technologies in teacher education process, evaluating pros and cons from comparative studies of the historical evolution of these technologies and their use in everyday life of man, particularly in school, providing the CEFET-MA of experience as an illustration for a better understanding of what is proposed.

Keywords: Information and Communication Technologies, Case Teacher Education

1. Introduction

In human activity, technology is a means of enforcement and intervention, which is based in mobilizing technical and scientific knowledge capable of increasing productivity [1].

Information and Communication Technologies (ICT), is a set of technological resources that, if integrated with each other, can provide the automation and / or the communication of various types of existing processes in business, in education and scientific research in the area banking and finance, among others, that is, technologies are used to collect, distribute and share information, such as: Web sites, computer equipment (hardware and software), telephony, kiosks and information desks of automated services [1, 2].

The area of education can benefit from ICT by leaps in quality and creativity, all in the name of a new way to see this ”world” and this will strengthen the basic
education provided to scientific research, through distance learning (EaD). Generally, the technologies are associated with the interactivity and fall with a communication model - all, in which information is transmitted unidirectional way, adopting the model all - all in those that integrate network connections operationalized through ICT are part of the transmission and receipt of information [3].

1.1 Education and Information and Communication Technologies (ICT)

The major impact of ICT (computers, communications systems, among others), are needed in education, with a design education, as a result of the importance of socio-political educational goals, the processes of communication and discussion by teachers, a proposal and an educational project management in modern society. Thus, in current society, in a process of economic globalization and educational consequently, one can not define the roles of education without considering these changes indicate that more unknowns that certainty. The common point is to recognize that today, knowledge and information are determining factors in social and political life [4].

The criticism of ICT within education relate to the dehumanization of the X student teacher, or that in a globalized world, ICT is able to impose a dominant culture to other, socially disadvantaged, leading to a loss of cultural identity, increasing the social gap between them, and that ICT will only be allowed access to companies prepared for this, with a man able to dominate them and not the opposite.

On the departure, has been shown that the appropriate management of ICT can accelerate the teaching-learning process and help raise the quality in education. In this case, what matters is not the medium itself, but the content of teaching and the way that leads the process.

When you use the technology in education, it must meet the specific needs of the society in which it is inserted, and should lend itself to variants policies, social systems, the interests of recipients and the demands for greater democratization of education.

That said, we should not talk about education and education, considering the interrelationship between society and technology education, historically determined, since they differ different educational practices in different societies over time, using different technologies [5].
1.2 Change of behavior: the relationship between old and new

In all moments of our lives we are moving between the old and new, on occasions, with the brand new.

Among many things we are charged on a definition for our ideology, a political position, the theories of learning to embrace, on the way we deal with our students, about our methods and, of course, beyond the view on the most different subjects, as it would no longer be on technology, especially computers. Ai then, as questioning!

What can I do with it ... I bought a ... Where can I do a course? ... That way I do? ... You already know how to use ... What do you think of this new "fashion"? What should I buy? ... How can I use it in my work ... What is it that the Internet ... Technology in the classroom ... It is not too expensive ... Do all these questions and their answers are as teachers, labeled in OLD, NEW or SO NEW, citizen conservative or progressive.

Used in all fields of knowledge, arts and natural sciences and humanities, and even in our day to day, the computer has been used as a tool increasingly vital to our day-to-day.

There are still those who resist the changes and news, for pure nostalgia or exotic behavior, as some writers and / or teachers, using the practice of the draft manuscript. This is an old behavior.

The opposite of what occurs when a few people who take time to accede to the use of computer, stubbornness, and end up becoming "boring" on this defense, getting to the point of laser printing up tickets for internal movement, looking forward to show that are modern.

The new technology is the use of natural way, so that the concepts remean for the potential use of computers (webphone, webradio, webcam, ...), webclass in various activities of daily living, especially in intellectual work, without this cult to mean a machine [6].

The newest is using it, appropriately, in the educational process, allowing its inclusion in "the classroom", together with other resources that the computer provides.

The old is the resistance of some schools, teachers and officials, even from some universities to accept the presence of modern information and communication technologies in various sectors of activity, in particular, the computer in the classroom [6].

2. Computer at school: planning the entrance of computers in the classroom

The demands of the current, vibrant and competitive global market, allied to the demands of a continuing education, increased information and knowledge to be
gained and the reduction in time for training in schools, made the search for alternative methods of education, from the existing educational models, in order to make them more flexible and in line with the new technologies available, in a great challenge and, with it, the theories underlying the use of ICT in teaching-learning process, which minimizes the complexity of it, in particular those relating to educational issues because we can see that [7]:

- The pedagogical models they use, appropriately, ICT, enable better design of learning;
- The current education systems, mediated by ICT, offer an appropriate evaluation mechanism, is also learning how the system itself.

This feature, increasingly prevalent in the world of work, increased considerably, the distance between the school and company, as the scientific innovations, and increased use of ICT in the production process, makes the profile of vocational training by schools in current society, are increasingly required by the competitive, demanding and global market.

- The school's educational project should be transparent and understandable for everyone, not only for the direction and the team teaching the school;
- Set the priorities of the school, where they are, indeed, teaching, computers will be among the first options;
- Raising awareness for the use of computers, before training teachers and other education professionals.

2.1 The computer in the classroom

STAGES [7,8]:
1. Budgetary possibilities of lifting the school to assess the type of computer equipment to be acquired and its adaptation to the economic reality;
2. Set the integration of computer and / or the computer in the school's pedagogical project;
3. Early stage of awareness and training of a CULTURE OF EDUCATIONAL COMPUTING in school;
4. Breaking the barrier between users and technology, whatever it may be, and between the old and the new thinking the content taught.

3. The use of computer education and distance learning (EaD)

The legislation defines the latest EaD as "... a form of education that enables self-learning, with the mediation of teaching resources systematically organized, presented in different media for information, used alone or combined, and served by various means of communication" [7].

Until a few years ago, the distance education was synonymous use of correspondence and television. The transfer of knowledge through the use of the
correspondence is static, as the most used to do it is written, where the student should endeavor to read and understand concepts which are presented in forms, many times, not very illustrative, because there is no involvement of the educator. The use of television, is the ease of the student be brought to passivity, failure to monitor their performance, and the omission of research and reading [8, 9].

Table 1 can assess a comparative study between technological progress and impact of teacher education in the process, in particular the provision of distance learning.

**Table 1. Technology Used in EaD**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Season</th>
<th>Developments related to the Distance Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press</td>
<td>XV century</td>
<td>Had great relevance in the dissemination of the distance education and may be considered the most important technology for this before the advent of modern technology. Its importance was mainly by greater power of reproduction of texts on the cards, and then the first mode of distance education in the mass.</td>
</tr>
<tr>
<td>Radio</td>
<td>20 years</td>
<td>Through the radio it was possible that the information (in audio) to be taken to remote locations, transmit the sound of a classroom.</td>
</tr>
<tr>
<td>TV</td>
<td>40 years</td>
<td>Allowed the transmission of sounds and images, which allowed the addition of visual information for teaching the distance. Thus, it was possible to remotely audiovisual components of a classroom.</td>
</tr>
<tr>
<td>Computer and Telecommunications</td>
<td>90 years</td>
<td>It allowed the transmission of text, images and sounds for any part of the planet. In addition, allows the information becomes available for an indefinite period, thus allowing a person has access to information when you want. That is, you can access a non-linear, asynchronous (e-mail) or synchronous (’s chat), and interactive information. Thus, the computer, along with technological advances telecommunications expanded the possibilities of distance education.</td>
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### 3.1 EaD and the Internet

In addition to the intrinsic characteristics of computers, the advent of the Internet has been increasing even more its advantages as a vehicle of knowledge. Recent studies show the Internet as the medium of faster growth in the world. It is shown (Table 2) that to grow to the size of up to 50 million people, the radio needed 38 years, 14 of the TV, the cable TV and the Internet only from 10 to 5 years. With
the popularization of the Internet, the DL became increasingly close to the people, going from theory to practice. The Internet shortens distances between the centers of knowledge.

Table 2. Trajectory Technology [10]

<table>
<thead>
<tr>
<th>System</th>
<th>Decade of the commercial launch in the world</th>
<th>It reached 50 million users in the year ...</th>
<th>... when the population was ...</th>
<th>... with a system for each ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone</td>
<td>1900</td>
<td>1970</td>
<td>3.8 billion</td>
<td>76 people</td>
</tr>
<tr>
<td>Radio</td>
<td>1930</td>
<td>1968</td>
<td>3.7 billion</td>
<td>74 people</td>
</tr>
<tr>
<td>TV</td>
<td>1950</td>
<td>1964</td>
<td>3.2 billion</td>
<td>64 people</td>
</tr>
<tr>
<td>Internet</td>
<td>1990</td>
<td>1995</td>
<td>5.8 billion</td>
<td>116 people</td>
</tr>
</tbody>
</table>

The use of Internet services mainly WEB enabled the creation of environments where students can interact with each other, thinking, questioning and exchange a large flow of knowledge and experience between the components of the teaching-learning process, from the main services offered by the Internet[11]:

- **E-mail.** It is the digital form of correspondence sent by the network. He sets up a method of asynchronous communication, but it has very high efficiency and low cost;
- **Chat.** Also known as chat. The simultaneous communication between several people the Web encourages the exchange of information. It is therefore a means of synchronous communication, also having a reduced cost;
- **Groups for discussion.** Stimulate the exchange of information through various messages between members of a virtual community who have similar interests;
- **World Wide Web (WWW).** Or simply the Web, it can be defined as a major information system that allows the recovery of hypermedia information. The Web offers the possibility of universal access to a large number of people to a large universe of documents. In addition to documents, can be displayed more interactive systems that allow the user to have an almost immediate return of their actions. Thus, one can, for example, tests online, where the user, the end of it, knowing what is and what its outcome was right and wrong issues, noting also what should be the correct answer, among other things;
- **FTP and Download.** It is the availability of files containing both audio, text, images or videos, as systems that can help in many respects the teaching desired;
Videoconference. It can be made with cameras attached to the computer, with transmission of images and sounds via the Internet (a worldwide network of computers).

3.2 Advantages of the X EaD WEB [12]

- **Interactivity:** in classrooms, the interactivity is limited to physical and temporal limits, which does not happen with the resources the Web, where there are no restrictions on the location and, as to the time factor, the student can access the Internet at any time;
- **Teaching independent of time and place:** the training can be done anywhere at any time, as explained in the previous item. The scope is limited by the scope of the Internet;
- **Minimization of displacement:** no need for frequent travel to predetermined physical locations, which also provides a cost savings on transportation, food and lodging;
- **Save time:** that there is a minimization of displacement, there is, consequently, a reduction of time;
- **Attendance at mass personalized** (*mass customization*) is the possibility of offering education in mass with the adequacy of the characteristics of students.
- **Learning the rhythm of the student:** causes the individual to take an active role on the pace and needs of learning;
- **Network:** facilitates and promotes the exchange of experiences, creating a virtual community. This exchange enriches, encourages and stimulates the students' learning;
- **Independence of format:** The Web, by design, allows the simultaneous transmission of information in various formats (image, text, sound, animation, video, etc.). The data can be encapsulated second specific patterns and transmitted via network;
- **System dynamic and incremental:** a means of transmission is very dynamic (constantly update the content). Since the original information is stored on a server and all clients to use the same source, where it is updated or modified the effect is felt immediately by all users. New information can be continuously added to the database in an organized manner and information that no longer has value may be eliminated. This feature is very important in areas of knowledge in which content is modified or grows quickly;
- **Independence geographical:** Access-based information only depends on the existence of a terminal with Internet access and availability of a browser, no matter the location and distance from the server;
- **Independence temporal:** Access-based information can be done at any time, according to the availability of time of the user.
All these features make the DL is, currently, mainly associated with the use of the Web.

4. The experience of CEFET-MA

Implement and deploy a program of improvement of school-business, from an educational project, applied to the subjects of vocational training courses covering the deepening of understanding of processes related to the appropriate application of ICT in the process called education teacher, with a view to propose a set of indicators related to the appropriate use of these, particularly when it comes to the process of training of Technician in Metallurgy and Materials formed CEFET by-MA in order to allow a correct diagnosis on the effective use of resources for the purpose to maximize the use of them, reducing distances and promoting improvements, particularly in the processes of training and all that, so far, it is necessary:

- Strengthen and improve the scientific and technological quality of students;
- Compare the indicators obtained in the control group to evaluate the validity of the program;
- Strengthen cooperation between the research groups of CEFET-MA, through the integration of researchers in a continuous interaction of training and scientific and technological production;
- Promote the research and subsequent dissemination of the results of publications in journals, magazines and participating in scientific events.

4.1 Methodology

Development of what was proposed as a starting point, the results and experiences of work already undertaken and related to the issue at stake. However, the proposal is produced from the activities implemented for the development of this work which included:

(i) review and a conclusive study of subjects relating to paradigms teaching / learning, teaching / learning methodologies for corporate and education; use of ICT in the teacher education and training,
(ii) identification of population, sample, variables and indicators that form the search diagnosed,
(iii) technical visits which consisted of a learning process and the practical assessment of the use of ICT in the same; 
(iv) survey data with the diagnostic evaluation of the current situation of use or not, by teachers of a course of Metallurgy and Materials of CEFET-MA, for ICT in their teaching-educational process, 
(vi) assessment of the proposal with correction of failures occurred on the same points.

The resources needed for the work included, in addition to classes, laboratories, equipment, library collection, Internet access and the entire organizational infrastructure of the institution, available to the teacher-education process, which
made it very feasible to roll and, especially, maintenance of this work, considering all the material conditions of the education center.

4.2 Results

Inserted in the world, in Brazil, and particularly in Maranhão, education is being affected by many problems. Therefore, it is extremely important to seek new methods of learning, trying to benefit from modern technologies and methodologies to improve the strategies for teaching. In order to further stimulate the students, especially those who are in training.

As preliminary results, considering that the proposal is in the initial phase of deployment, you can understand the great concern of the faculty about the appropriate use of resources available on this site, and the improvement and / or training in the use of so-called ICT in special education teacher in the process.

We also saw from the results obtained from the questionnaires applied to faculties and students of the CEFET-MA, as the prospect for the use of ICT in teaching learning process, a set of indicators able to portray and, above all, provide conditions for improving this.

5. Conclusion

Therefore, we can conclude that in modern society, technology evolves, the social character of education, namely, the socialization of man, remains as one of the pillars that Embase, remaining still the same, according to the Report of the International Commission for UNESCO on Education for the twenty-first century [13], the responsibility to convey the basic elements able to allow the man, through the educational process, the socialization of that consists of learning to live, sustained in tripod: learning to know, learning to do and learn to be.

Educating the man in this new century is undoubtedly a great challenge for the educator who assumes a role of extreme importance in the educational process, always ahead of any technological innovation, strengthening and, assuming the time, their role in driver of this process.

References