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TELECOMUNICATION TECHNOLOGIES IN EDUCATION: THE MAIN STAGES OF FORMATION

The emergence of telecommunication technologies in education has been analyzed from the point of view of the historical development of learning technologies. Great attention is paid to the specific features of learning technologies at each historical stage.

Key words: *synchronous, asynchronous, interactive, learning technologies, web-based pedagogy, broadcasting, electronic media, computer-telephone system, real time interaction.*

The area of Telecommunications is a fast-paced business with major changes occurring almost daily and an integral part of any learning process. In the toolbox of distance educators today there are many options. These include tools for transmitting educational programming to any point on the globe or for distributing information only within a school district. Educators now have the capability to transmit from a single site to many receivers or only from point to point, as in one desktop to another. Such transmissions can be one way or they can be interactive. They can be synchronous, that is, they can be live, direct and in real time or asynchronous, to be responded to later. They can be symmetrical with an equal volume of voice, video or data information going both ways, or asymmetrical, in which a greater volume of information travels in one direction and a smaller volume travels in the other. Educational materials can be

pre-produced, packaged for high impact with carefully considered educational value, or generated on the spot, as with Web searchers and creative problem solving. Thus, the cost of preparing educational materials and the lease or purchase of the channels by which they will be distributed can be quite expensive, or quite modest.

Today's educator must know which technologies should be included in the distance teaching toolbox, or which are the right tools for the particular educational need. That's why researches in the field of telecommunication developments have focused on the following areas:

- advances in multimedia application development tools
- browsing and navigation tools collaborative learning and work
- web tools and facilities
- virtual reality
- electronic publishing, digital libraries and the web future issues in web technology
- educational multimedia on the web electronic commerce
- industries and services integration of web applications and services
- statistical tools and user tracking teaching
- computer-human interface and ergonomic issues
- psychology of web-use search engines
- courseware development data

Regarding the technological approaches to DL, the majority of the published work may be covered under the general title 'new technologies for old problems'. **Ferguson** has argued on the presentation of educational material in web-based environments and on the dialog between students and instructors (1996). This implies a transfer of guidelines of stand-alone hypermedia applications to web environments, emphasizing on interaction and feedback.

Koutoumanos and his associates proposed a similar approach (1996). They presented a networked hypermedia system, which is distributed without a central server, consisting of sophisticated search mechanisms.

Borkowski and her associates proposed an integrated working environment for supporting teaching and learning via the web, simply transforming hardcopy linear

instructional materials into web-flexible educational and administrative tools (1996). Their main concerns were if the web is a panacea for all courses, and if the students have the basic technological background to make use of the web.

Hobbs and Taylor proposed educational multimedia design for web-based education, categorizing the ways for exploitation of web-based learning environments (1996). At first, they proposed the web for research and information seeking, offering the learners a practical means of following up the educational resources discussed. Secondly, they proposed the web as a teaching tool, designing tutorials and interactive online lessons. They also used the web as examiner, offering tests and quizzes for both assessment and self assessment. The authors proposed the web as an educational forum, providing a basis for virtual debate and discovery, and finally as a collaborative environment. Although the authors did not mention pedagogical models and principles, it seems that they apply both constructivist and behaviorist approaches.

Motiwalla and Tello (2000) proposed a Web-based model utilizing a combination of synchronous and asynchronous communication tools. The authors' goal was to maintain the positive aspects of a traditional classroom in an effort to avoid the social isolation problems learners encounter in virtual and remote environments. The key features of their web-based pedagogy and the implemented instructional approaches were substantially transferred from general educational practices, served by the technology. The authors concluded that interaction technologies could meet the learning needs of the students in distance learning environments.

As we see there is a wide range of researches based on the analysis of the different types of telecommunication technologies and the perception of the meaning of this term takes great importance. So, **the purpose** of this article is to study the emergence of such a term (telecommunication) from the point of view of the historical development of learning technologies.

A lot of different definitions of this term can be found in scientific literature:

Telecommunication is communication at a distance by technological means, particularly through electrical or electromagnetic waves [1;77].

Any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems [3;98].

Telecommunication – an umbrella term that covers broadcasting, electronic, media, telephone and computer technologies [5;64].

So as we see telecommunication is a young product of the twentieth century. The study of radio and television at the university level didn't begin in a widespread manner until the 1960s. At that time there were two media – radio and television, and together they were called *broadcasting*. By the late 1960s, broadcasting was divided into two categories – commercial and public originally called educational.

In the mid 1970s a number of other media came to the fore to challenge radio and television. We mean cable TV (CATV), videocassette recorders (VCRs), direct broadcast satellite (DBS), satellite master antenna television (SMAT), subscription television (STV), low power television (LPT). Also during 1970s many companies began using television particularly for training. The word *broadcasting* no longer seemed to apply because that word implied a wide dissemination of information through the airwaves. Many of these other media were sending information through wires, and cable TV was even going around courting its narrowcasting because its programs were intended for specific audience groups.

In the 1980s when the new media weren't so new anymore, they began being referred to as developing technologies, but some of them didn't develop very well. In fact a number of them just died. Generally the term electronic media was used to describe broadcasting and the newer competitive forces, but sometimes the word *telecommunications* was used to label the entire group, including industrial TV, which by now had changed its name to corporate TV. The whole concept of television as a form of mass communication began to change. Prior to the 1980s most people watched the same programming at the same relative time. There were some networks sending out programming to be viewed by generally passive masses. Individuals could accept or reject the programs but they couldn't «talk back» or interact. This differed from interpersonal point-to point communications where a small group of people engaged

in give and take on a subject through telephone conversations, letters, or face to face talking.

With the introduction of a variety of delivery systems, TV became a more fractionalized medium that appealed to smaller groups of consumers. People could tape programs off to watch whenever they wanted. They could watch one of the many cable channels, public broadcasting, one of the independent TV stations that by then had grown in stature or one of the other alternative media forms. They could also watch programs on the newly formed network.

In the 1990s the field of study broadened even more. Telephone companies started to enter areas that had traditionally been reserved for broadcasters and cablecasters. The once lowly phone also allied itself with the computer, spawning a whole new array of interactive service. An information highway started emerges as interlinked computers were used to exchange electronic mail and other information stored in computer data banks. The entry of the phone industry into electronic media, in a way brought broadcasting full circle. Radio has its antecedents in the telephone because, at one point, the telephone was seen as a mass medium and the radio as an individual, private medium. The original idea for the telephone was that it would deliver words and music to large groups of people. With the development of radio, many people tried to invent ways to make the signals private so that two people could have their own confidential conversation. Of course, over the years the two media switched roles – telephones being the private medium and radio becoming the mass medium. The two also went their separate ways academically and socially.

Then along the computer came and the modem. The modem enabled data generated by the computer to be sent over phone wires to another computer. Some of the information being transmitted over this computer-telephone system was not private but was intended for anyone who wanted it including those in corporations. It included news, stock market quotes, sports and other information traditionally provided by radio and TV as well as newspapers and magazines. The term telecommunications was taken over by the telephone industry to encompass both the old telephone services and all the new data transmission and other services the computer enabled the telephone to undertake.

Now the telephone, computer radio and TV broadcasting, cablecasting, DBS, VCRs, SMATV, MMDS, corporate video newer technologies – videodisks, CD-ROM, virtual reality multimedia form new types of information and entertainment suppliers.

Conclusions:

The most common word used to encompass all of the discussed learning technologies is telecommunications but the word or even the concept could change in the near future.

The words telecommunications, electronic media and broadcasting are used interchangeably depending on the circumstances and the period being discussed.

Telecommunication is one of the most important forces in the educational process today. It influences education as a whole and it influences every one of us as an individual. As each year passes, telecommunication grows in scope.

All indications are that telecommunication will continue to change at a rapid pace and some knowledge of the background is an essential part of this process.

Table 1 presents the main periods of transformation of the simple learning technologies into telecommunication ones

Table 1. Historical characteristics of the learning technologies

GENERATION	TECHNOLOGIES	TIME	FEATURES
First	Printed material, customized textbooks	End of 19 th – beginning of 20 th century	Correspondence learning
Second	radio, television, audio-tapes, telephone	Early 1970s	Correspondence Teleconference (radio & television)
Third	Communication networks (satellites), audio, video, CD-ROMs, bulletin boards	Early 1980s	One-way video two-way audio communication, real time interaction, two way videoconference
Fourth	Telecommunications, Internet	1996 –	Interaction and collaboration, shift from instructor-led to learner

			– centered approach, student – student interaction
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Телекомунікаційні технології в навчанні: головні етапи розвитку

Аналізується поява терміну «телекомунікаційні технології» з точки зору історичного розвитку навчальних технологій. Значна увага приділяється вивченню особливостей навчальних технологій на кожному етапі їх історичного розвитку.

***Ключові слова:** синхронний, асинхронний, інтерактивний, навчальні технології, веб-педагогіка, трансляція, електронні засоби, комп'ютерно-телефонна система, спілкування у реальному часі.*

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Телекоммуникационные технологии в обучении: основные этапы развития

Появление термина «телекоммуникационные технологии» анализируется с точки зрения исторического развития технологий образования. Большое внимание уделяется специфическим особенностям учебных технологий на каждом этапе.

***Ключевые слова:** синхронный, асинхронный, интерактивный, учебные технологии, веб-педагогика, трансляция, электронные технологии, компьютерно-телефонная, общение в реальном времени.*