The aim of this study is to review, comparatively, the applications on the instructional technologies (methods and media) in the World and Turkey; The study, first, introduces the instructional technologies such as distance education, Internet, and Computer Assisted Instruction (CAI) in the World and Turkey; then determines and discusses the applications and major problem areas on the using of the instructional technologies in Turkey compared to the developed countries.

The term, discipline, is usually reserved for areas of inquiry and application that have been established over time and follow established paradigms. There is likely to be a consistency in their basic beliefs, rationales and common principles that define the scope and structure of the discipline. The terms of identity related to this article, “instructional technology” and “educational technology,” are still used interchangeably even though official definitions of each are somewhat different.

Instructional technology, according to the current definition of the Association for Educational Communications and Technology (AECT) is “…the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning” (Seels & Richey, 1994). In the same volume, the glossary listing for “educational technology” says “See Instructional Technology.” The previous definition publica-
tion of AECT (1977) used the term, “educational technology” and defined it as “...a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning.” This is a broader definition of educational technology while the 1994 definition has a narrower focus and uses the modifier, “instructional.” Both definitions are drawn from the same basic roots: communication theory, systems theory, and learning theory.

The second half of the 20th Century has witnessed a dramatic inflow of instructional materials to the classroom with electronic media taking the lead. In 1950, Schramm (1977) noted that it was very difficult for a school to buy textbooks, audio tapes, overhead transparencies, and others, but by the 70s textbooks and educational films commercially produced for school use in the United States had increased by 200 and 600% respectively. Audio discs increased by seven fold and filmstrips increased by an order of 800% (Schramm). However, Schramm did not include any statement of any increase in academic achievement as a function of increase in the soft inputs nor does he make any budgetary comparisons.

More recent records show that technology in schools increased more dramatically in the 1980s. In 1981, for example, only 18% of public schools in the United States had at least one computer for instructional use. Ten years later estimates put that figure at 98% (Mageu, 1991; QED, 1992). In the 1988-89 school year, 25% of the school districts in the USA had modems and according to (Mageu) that number was expected to double by the year 1991-92. The number of schools using video cassette recorders had more than tripled from 31% in 1982 to 94% in 1992 (QED, 1992), but like in Schramm’s report, no statement on cost-effective analysis was made. This incredible development of media access in the United States, Europe, and Japan must have been based on four factors which, in a sense, constitute advantages that the developed countries have over the developing countries.

The first is the technological advancement of the country in question, which allows for innovations to be locally executed without import costs. This has other advantages such as materials produced according to required specifications, quick delivery, and support services in case of malfunctioning. The second advantage is the support that schools have from individuals.

The third advantage is the existence of clearly specified policies on media application, which support teachers when using media facilities. The
last is the flow of research funds available for evaluation of media effects. Research results from such studies act as a base for future planning. The situation reported by Orson and Greenbert (1990, p. 164) on the innovations in instructional materials at the University of Nairobi presented a representative case study of media typical of most developing countries. A whole university that houses six colleges in different campuses has a single overhead projector, a single film projector, and a photocopier in its media centre all of which are shared among the six different colleges.

It is illogical to expect any better situation in the elementary schools. The traditional media of printed text, the infamous chalkboard, a few models, and teachers’ own innovations such as a straw abacus and hand drawn graphics are a common scene in the elementary schools. In secondary and post secondary schools and colleges only one of each type of media equipment as reported by Orson and Greenbert (1990) is not unusual. In fact, the responsibility for development and application of media is left up to teachers, with minimum support from school authority. Recordings of their excellent performance will be discussed later. Besides poverty, it could still be argued that there are causal administrative problems that could be discussed in four areas: (a) low economic and technological development; (b) lack of governing policies; (c) excessive population growth; and (d) political instability (Levira, 1997).

Instructional methods and technologies such as distance education, computer assisted instruction, computers, and the Internet are widely used all over the world today. Turkey is a developing country and has very important problems using of instructional technologies just mentioned. It faces problems similar in scale to other developing countries.

The aim of this study is to review, comparatively, the applications on the instructional technologies (methods and media) in the world and Turkey; the study, first, introduces the instructional technologies such as distance education, the Internet, and computer assisted instruction (CAI) in the world and Turkey; then determines and discusses the applications and major problem areas using the instructional technologies in Turkey compared to developed countries.
INSTRUCTIONAL TECHNOLOGIES IN THE WORLD

In this section of the article we want to introduce the instructional technologies (methods and media) such as distance education, the Internet, and CAI in the world.

Distance Education in the World

It does not matter that what is called distance education is not a new concept. It is widely used in all over the world today, in such countries as the United States, Canada, Australia, Russia, India, most African countries, and England, Germany, Turkey, Sweden, and The Netherlands in Europe, and Eastern European countries such as Poland, Hungary, Romania, and so forth for more than 100 years. It means that the history of distance education can be discussed generally in five clear periods. These periods can be listed as:

- A period before correspondence education. Some educational activities tried to compensate for the lack of traditional education processes before constructing and establishing correspondence education systems.

- Heavily applied correspondence education systems period. Correspondence education systems widely used printed materials using the postal system for delivery of books, newspapers, guide books, or other printed medium for attaining their goal.

- Instructional radio and television, which is called the one-way communicational period by broadcasting. In this period, broadcasting radio and television used functionally in addition to printed material for course materials.

- Then two-way communication started with the audio and interactive period. With two-way audio and video between teachers and students, educators are able to include more interaction distance education.

- In delivery of distance education, the fifth period can be described using satellite and future technologies, which are integrating through computer and computer combining systems. Telecommunication technologies such as radio, television, video cassette, computer, satellite, and fiber-optics are aiding educators, by the development in the com-
Murphy (1996, p. 418) said that distance education programs worldwide use a variety of technologies that include print materials, audio and video cassettes, audio and video teleconferencing, one-way and two-way television, computer-mediated communication (e.g., electronic mail, computer conferencing), and more recently, the Internet. Bates (1995) classified the technologies that deliver instruction to distance learners as two-way interactive or one-way noninteractive.

The opportunities for wider access to information have been improved dramatically with the development of communication technologies. Early distance education delivery systems were primarily print based and were referred to as correspondence courses. These courses were extremely effective in providing information to students at a distance. What was missing was interactively. Nevertheless, the early courses met an educational need by providing an alternative time and place for instruction for many people unable to attend educational institutions. In the 1970’s with the growth of the British Open University, the model changed. The two goals of the Open University were to make university study more available to working people, and to use broadcast media to bring education into the home (McIsaac, 1996).

The distance education system is applied in over 200 countries, which advocate themselves as an alternative to conventional education. They have inserted modern communication means in their operations to be functional, or to render service in meeting the needs of the masses. Of course, it is not true to say that distance education is a unique alternative to all education systems, especially of conventional education.

In the last 10 or 15 years, distance learning has boomed all over the world. Large open universities enrolling over two million students have been established in Asia, including the Chinese Radio and Television University, the Sukhothai Trammathirat Open University (STOU) in Thailand, the Universitas Terbuka (UT) in Indonesia, and a half-dozen open universities in India.

Korea continues to rely on correspondence schools to meet its goal of universalizing secondary education—as Japan did until very recently. In the Middle East, distance learning institutions have also expanded. The Anadolu Open University in Turkey, with its over 700,000 students, has already
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trained and graduated 200,000 teachers, and its programs now reach more than two and a half million Turkish citizens who are living in Germany and West European Countries. Additionally, the Open High School started distance education in 1992, and now, it is five years old and its student population has reached nearly 100.

In Africa, smaller institutions and distance programs have taken hold. Following the tradition of Colombian radiophonic schools of the late 40s, Latin America displays an exciting array of distance learning institutions. Some programs are like Universidad Estatal a Distancia (UNED) in Costa Rica and Centro de Accion Pro Educacion Cultura a Distancia (APEC) in the Dominican Republic are very small. Other programs like Mexico’s 20-year-old Telesecundaria or Brazil’s Telecurso reach several million secondary students day by day (Demiray, 1997).

Models of distance education reflect government or national policies. In Korea, for example, a cable TV channel forms the backbone of the distance education delivery system. Over the past 15 years, the UK Open University has worked closely with the British Broadcasting Corporation to deliver course materials. China’s massive distance education program uses print materials and nationally televised broadcasts. France, with its emphasis on sophisticated technology, uses satellite video transmissions to deliver programs to primary school, secondary school, and university students. Their well known telephone support system, Tele-Accueil, is staffed by tutors who can answer students’ questions about particular course materials. Indira Gandhi National Open University in India relies heavily on print based materials. Since they have access to only three 30-minute slots of nationally broadcast television each week, they have developed OPENET, a wide area open education network that links the open universities with regional centers using voice, data, and images.

Many of the countries like France and the United States are using distance education technologies to prepare programs for elementary and secondary school students. In the United States, distance education in primary and secondary schools developed as a way to offer supplementary courses in a variety of languages, advanced science and math, and specialized subjects, which small school districts could not otherwise afford for their students. In an effort to equalize educational opportunities for all students, prepackaged courses have been developed and are sold by course developers to school districts for use in the classroom where there is a trained teacher to help
students. There are also a growing number of universities that are offering advanced degrees online using a combination of technologies. Students from around the world are taking occasional courses or complete degree programs from these online universities. Nova University, Fielding Institute, National Technological University, and numerous community colleges are but a few. Most universities are now offering some of their courses online using the World Wide Web (WWW or Web), and the World Lecture Hall lists a few of the courses available. International students are taking advantage of these courses to improve their education without having to leave families and travel half way across the globe (McIsaac, 1996).

**Instructional Uses of Internet in the World**

The Internet is simply a network of hundreds of thousands of computers all over the World, connected in a way that lets other computers access information on them. So if a computer is connected to the Internet, in principle, it can be connected to any other computer on the network. Today, the Internet comprises more than 4,5000 regional, national, and international networks, which connect more than 30 million people in over 200 countries. This includes organizations, schools, universities, companies, governments, groups, and individuals (Gray, 1999).

Most literature is directed at the Internet as a tool for educators. The instructor’s interest and convenience appear to be the key factors for the use of the Internet as a teaching tool. The instructor appears to use the Internet for courses if she or he has a strong interest in using the Internet or if the Internet facilitates ease of course presentation. Halasz (1997, p. 93) provided an example of the instructor-focused nature of the Internet as a teaching tool. Online education offers “flexibility, accuracy and convenience” as well as “cost and time savings” for the instructor. The question remains: Is this new educational method effective for students?

In recent years, higher education has shifted from a teacher-focused style of instruction to a more learner-focused method of instruction. This philosophical redirection is characterized by a shift from “teaching as telling,” in which the teacher controls and is the center of the learning atmosphere, to “teachers facilitating access to information for the learner” (Forsyth, 1998, p. 15).
The Internet can be used as a supplement to traditional instructional methods. To complement a lecture, instructors may ask students to find specified Web sites to gain more in-depth knowledge about a particular topic. An instructor may also ask students to search the Internet for information on services offered in a particular location. In preparation for a class topic such as diversity, students may be asked to search the Internet to learn about different ethnic groups or populations at risk.

The Internet may also be used to replace the traditional classroom lecture. A number of courses are being developed in which portions of the course or the entire courseware offered through the Internet. The instructor may place course notes on Web pages, may create a video recording of a live lecture for viewing on the Internet, or use combinations of these ideas. Forsyth (1998) discussed several methods of preparing courses for the Internet including facilitating the use of video clips on web pages as well as the use of forms and other graphics on web pages.

A final area for instructor awareness is student fear and/or lack of knowledge about computers and the Internet. Primary and secondary students have increasing access to computers in elementary schools and high schools, but this does not mean that all college students are entering post-secondary education with a competence or comfort level with computers that supports their use of the Internet as a learning tool. Returning students may have had very little access to computer technology during their life experiences. Traditional-age students may have had poor computer instruction or may have slipped through the primary and secondary educational system without learning about computers and the Internet. Instructors need to take into account the varying skill levels and comfort levels of students when designing Internet material for courses (Forsyth, 1998).

According to Chickering and Gamson (as cited in Rither & Lemke, 2000), good practice in undergraduate education; (a) encourages student-faculty contact, (b) encourages cooperation among students, (c) encourages active learning, (d) gives prompt feedback, (e) emphasizes time on task, (f) communicates high expectations, (g) respects diverse talent and ways of learning.

Although these principles may be addressed without technology, the Internet offers a rich and efficient scaffolding for educators to address them (Rither & Lemke, 2000, p. 101). Wilson and Hord (2000, p. 35) said that the new millennium will see a dramatic increase in the numbers of internet-
assisted and internet-based courses offered by colleges, universities, and corporations in a wide variety of disciplines.

Although the origins of the Internet stretch back several decades, it is only in the last few years that it has really come to fore. The net is essentially just a massive communications system that can link any computer, anywhere in the world, to any other. Recently, electronic communication, particularly e-mail, has served to speed up interaction and this, together with the other facilities offered by the Internet, appear set to revolutionize distance education. The major Internet technologies available today are the following: webpages, streaming audio and video, forms, Java and activex, virtual reality, chatrooms, whiteboards and collaborative surfing, audio/video conferencing, computer mediated communication (CMC) (Davenport & Eraslan, 1998, pp. 410-427).

The tendency in the world regarding distance education is to pass from single-mode that doesn’t allow student-instructor interaction to the multi-mode that has important interaction elements. One-way video conference and television programs are generally supported by telephone or fax to establish two-way communication between the student and the instructor.

The point that is reached on the subject of distance education is the interactive education that is served through WWW or videoconference through the Internet. Distance, or “Virtual,” education, which uses the possibilities of hyper media and hyper text gives the opportunity of reaching more students worldwide. Video conferencing through the Internet may be much cheaper than the educational television programs.

The use of audio to distribute content over the Internet is another viable alternative. Audioconferencing is pedagogically learner-centered because it provides all learners with the opportunity to be active participants in an old technology that involves the broadcasting of video in real time simultaneously to many recipients (Wilson & Hord, 2000, pp. 39-41).

The challenges of CMC have also been well documented and include: (a) technical frustration due to the total reliance on technology and outside support systems; (b) increased time-on-task due to the slowness of the medium and the higher volume of messages, which also contributes to feelings of information overload; (c) frequency of miscommunication due to the loss of visual cues; and (d) disjointed flow of communication because of the
asynchronous time frame (Burge, 1995; Hiltz, 1994; Wiesenber & Hutton, 1996).

From the extensive analysis of the literature on designing CMC instruction, Berge (1995) concluded that students and teachers need to dramatically change the roles each plays in the learning-teaching process when moving from a face-to-face to a virtual classroom. Berge offered an instructional framework that categorizes teaching in a virtual classroom as a moderating function that has four essential components. They are: (a) pedagogical (didactic and guidance oriented, this role shapes online discussions to focus on critical concepts); (b) social (supportive and consultative, this role creates a friendly, inclusive, and collaborative learning environment); (c) managerial (administrative and organizational, this role sets the agenda, learning objectives, procedural rules, and norms); and (d) technical (technically skilled troubleshooter, this role makes the technology invisible to the users).

Grant and France (2000, p. 21) proposed a model for virtual classrooms, which is specifically geared toward developing (Caribbean) countries. They declared that advances in the development of the Internet infrastructure could be used within developing countries to enhance the delivery of high quality education to their citizens.

**Computer Assisted Instruction in the World**

CAI is a narrower term and most often refers to drill-and-practice, tutorial, or simulation activities offered either by themselves or as supplements to traditional, teacher-directed instruction (Grimes, 1977; Batey, 1986). The term, CAI refers to the interaction of a learner with a computer in a direct instructional role. CAI addresses course content in a variety of formats, with or without the direction of a teacher (Lockard, Abrams, & Many, 1997). CAI applications are used across many different computer platforms and operating systems.

The general research areas on the CAI in the world are the following:

- microcomputer use and student achievement;
- CAI and retention of learning;
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- the effects of CAI on student attitudes;
- CAI and different student populations;
- other beneficial effects of CAI such as locus of control, attendance, motivation/time-on-task;
- CAI and different curricular areas;
- why students like CAI; and
- cost-effectiveness of CAI (Cotton, 2002).

Some studies have found CAI to generate positive findings related to student achievement in reading (McCreary & Maginnis, 1989), business education (Din, 1996), and opinions of teachers to CAI (Berry, 1994). Sten nett (1985) found favorable results in the literature when reviewing CAI in education. A related meta analysis of 199 comparative studies involving instruction in high schools, institutions of higher learning, and adult education settings found that CAI increased test scores by .31 standard deviations (Kulik & Kulik, 1985). Although described research supports the use of CAI as a supplement to course instructor-provided information, the effectiveness of CAI as an independent instructional tool to learning gains is not conclusive. A number of studies have found no favorable results when comparing CAI to traditional instructional methods (LaBonty, 1989; Morrell, 1992; Ruef & Layne, 1990; Wiksten, Patterson, Antonio, Cruz, & Buxton, 1998).

The findings of research on the CAI in the world indicate that:

- The use of CAI is associated with other beneficial outcomes, including greater internal locus of control, school attendance, motivation/time-on-task, and student-student cooperation and collaboration than the use of conventional instruction alone.

- CAI is more beneficial for younger students than older ones.

- CAI is more beneficial with lower-achieving students than with higher-achieving ones.

- Economically disadvantaged students benefit more from CAI than students from higher socio-economic backgrounds.
CAI is more effective for teaching lower-cognitive material than higher-cognitive material.

Most handicapped students, including learning disabled, mentally retarded, hearing impaired, emotionally disturbed, and language disordered, achieve at higher levels with CAI than with conventional instruction alone.

There are no significant differences in the effectiveness of CAI with male and female students.

Students’ fondness for CAI activities centers around the immediate, objective, and positive feedback provided by these activities.

CAI activities appear to be at least as cost-effective as and sometimes more cost-effective than other instructional methods, such as teacher-directed instruction and tutoring.

The use of CAI as a supplement to conventional instruction produces higher achievement than the use of conventional instruction alone.

Research is inconclusive regarding the comparative effectiveness of conventional instruction alone and CAI alone.

Computer-based education (CAI and other computer applications) produce higher achievement than conventional instruction alone.

Student use of word processors to develop writing skills leads to higher-quality written work than other writing methods (paper and pencil, conventional typewriters).

Students learn material faster with CAI than with conventional instruction alone.

Students retain what they have learned better with CAI than with conventional instruction alone.

The use of CAI leads to more positive attitudes toward computers, course content, quality of instruction, school in general, and self-as-learner than the use of conventional instruction alone (Cotton, 2002).
INSTRUCTIONAL TECHNOLOGIES IN TURKEY

In this section of the article we introduce the instructional technologies (methods and media) such as distance education, Internet, and Computer Assisted Education (CAE) in Turkey.

Distance Education in Turkey

Although the distance education implementation in Turkey started in 1982, the discussions about distance education in general took place as early as 1927. This concept was thought to be beneficial in increasing the literacy rate among the citizens in Turkey. In those years, the other countries had already initiated the education through correspondence by mail. Due to the common belief that people can not learn reading and writing without a teacher, the idea of distance education was not considered in Turkey until 1956.

Between the years 1927 and 1955 the distance education merely remained as an idea. The first distance education project was initiated at the Research Institute of Bank and Trade Law, Faculty of Law, Ankara University in 1956. In this implementation, the bank employees were educated through correspondence by mail. In 1961, The Centre for Education through Letters was established as a sub-organisation of Ministry of Education, Turkey. This scheme targeted people who wish to complete his/her secondary education without attending courses. These attempts were extended in 1966. The establishment of Advanced Teacher Education School followed it. Later, in 1975 and 1978 two attempts to establish an “Open University” were unsuccessful. In other words, in Turkey, “Education Through Letters” (called in Turkish as being YAY-KUR) was implemented as a correspondence education. However, the required efficiency and success were not attained.

Again in 1970s, Eskisehir Economics and Commercial Academy, The Institute for Education through Television became a pioneer in the distance education area. In 1981, a governmental campaign was started to reduce illiteracy rate in Turkey. In this attempt, television was an important education tool. The program achieved a considerable success with a considerable increase in the literacy rate. In the same year, Turkish Higher Education Council provided an opportunity to implement distance education at Turkish
Universities. After these pioneering years, we witnessed a well-planned, scientific, and efficient approach to the distance education in Turkey (Demiray, 2002).

Turkey has a very visible and distinguished international presence and has one of the best known distance education programs in the world. John Daniels (1995), in his book *The Mega-Universities and the Knowledge Media* describes Turkey as having one of the 10 largest distance education institutions in the World. Mega-universities are schools that enroll over 100,000 students each year. Countries other than Turkey having mega-universities are China, France, India, Indonesia, Korea, South Africa, Spain, Thailand, and the United Kingdom. These countries have all achieved remarkable success in increasing student numbers dramatically while lowering educational costs (McIsaac, 1996).

In November 1961, Anadolu University was given the mission to carry out distance education throughout the country. Consequently, Open Education Faculty (OEF) was organised and 29,479 students were initially enrolled in Economics and Business Administration programs. This program used various tools such as printed materials, television programs, and face-to-face academic tutorials to reach distance education students. Later on these educational tools were extended to the use of video, computer, radio, and newspaper.

**Technologies of Distance Education in Turkey**

Technologies used to deliver distance education programs in Turkey are typically one-way and are designed to reach the masses. The two primary forms of distance education are the Open Education Faculty (OEF) at Anadolu University in Eskisehir and the Open High School (OHS) through the Ministry of National Education. The OEF, which been operating since 1982, delivers undergraduate degree programs and other programs to Turks throughout Turkey, Europe, and the Turkish Republic of Northern Cyprus.

The Open Education Faculty teaches mainly at the university level, using print materials, broadcasts, and some face to face teaching called academic counseling. The faculty prepares its own teaching materials. Print materials, that is the coursebooks, are sent to students on a term basis. About 200
programmes are broadcast on state television every year. Also, there are radio programmes for language courses. When the OEF started, academic counseling was given in 22 provinces.

The other form of distance education in Turkey is Open High School (OHS) through the Ministry of National Education. The OHS is a widespread secondary education program, which has been operating since 1992. The purpose of the OHS is to allow traditional and nontraditional students, who for one reason or another have not completed secondary school, with an opportunity to earn a high school diploma. The OHS curriculum is the same as for traditional high school students. The technologies for both programs include specially designed textbooks and other printed materials including newsletters and bulletins, television and radio broadcasts; technologies for the OEF include videotapes and face-to-face lectures at universities throughout the country. Examinations for both programs are offered in a variety of locations, usually in cities and larger towns. CAI, while not typically used in distance education, is being introduced into schools nationwide.

Some 400 textbooks have been edited and printed in Anadolu University. Hundreds of radio programs and 2,200 television programs have been produced here. Two studios in the three-story TV Center Institute generate the six hours of programming that the university broadcasts nationwide every day on Channel 4 of the Turkey Radio and Television Corporation (TRT).

The university has 81 administrative centers throughout the country’s 83 provinces. In 58 of the centers, academic counseling is provided, and students can attend noncompulsory evening classes several times per week. Only 8% of the student body has access to computers, 14 centers also provide Internet connections. The university’s web site (http://www.anadolu.edu.tr) recycles past examinations to help students prepare for future tests.

The system extends its reach to Nicosia, in northern Cyprus, as well as to Cologne, Germany, which enables the university to reach Turks living in Western Europe. A pilot marketing course was recently taught through videoconferencing at a Turkish language preparatory school in Kazakhstan.

The university recently received a boost when the Ministry of Education designated it to prepare the country’s preschool and English teachers, beginning this fall. The ministry’s decision was based in large part on Anadolu’s reach, which will enable it to offer instruction even in Turkey’s eastern regions.
To address the difficulty of students access to programs which are broadcast only once, Video Education Centers were set up in different cities. Two pilot projects undertaken in 1987 by the OEF of Anadolu University were designed to determine whether distance education students would benefit from watching videotapes of the educational programs if they were made available at Video Education Centers. Video education, which is planned at the beginning of the project is a supportive service and is only for distance education students of OEF.

In the 2000-2001 educational year, the online two-year instructional technology certificate program that Anadolu University offered has delivered lesson materials on the Internet and also other instruction services, such as books, software, digital video, academic counseling service, exams, a student department, support, and a virtual class break.

The CD-ROM software of General Math, Ataturk Principles, and Revolution History lessons have been developed by the Department of Computer Assisted Instruction (CBI) of Anadolu University Open Education Faculty. These CD-ROMs have television programs, electronic books, and also CBI software. The students who have internet connections have an opportunity to evaluate themselves by a link to an internet-based self evaluation exam system.

These lessons are developed by different teams in different times, and have been brought together with television programs and books so they appear to become instructional synergy. According to the findings of a research, the students of OEF said that the CD-ROM software are more useful and educational than textbooks, television, and academic counseling (Öztürk, et al, 2002).

**Instructional Uses of the Internet in Turkey**

In 1990, the first computer network connection in Turkey was established. During the first six years, several universities were the dominant users of this tool. However, since 1996, the Internet in Turkey has touched almost all sectors, including banking, education, and health.

Although there have been many attempts to integrate the Internet into Turkish primary and secondary school curricula since the mid-1990s, almost all
of them were lost in the slow working, highly bureaucratic, and centralized organization of the Ministry of National Education (MONE). However, a few private schools and institutions are allowing their students to use the Internet to communicate with foreign peers or conduct searches for information related to their homework. Further, most of them focus only on preparing students for the university entrance exam. Egitim.com, okulum.com and Mef-Digital are some examples of websites developed for helping K-12 students in this way (Aydın, 2001).

In 1993 a project named Computer Experimental Schools (CES) was initiated by the MONE with the financial support of the World Bank. In the CES project, 53 schools located in different regions of Turkey are to use specially equipped facilities for teaching and learning. It is also expected that a computer-mediated communication network linking these schools will provide a technological and pedagogical edge (Yedekçioglu, 1996).

The World Bank supported project, called the “Project for Globalization in Education 2000” began a very important step for the Turkish Educational System. The aim of this project was to follow the developments of the information age and to use instructional technology in each level of the education system to be able to create a society with adapted information and technology standards. Through this project, new computer labs were established in 2,451 primary and secondary schools in 80 cities and 921 towns in Turkey. In each of these schools the technology class rooms were equipped with: computers, printers, scanners, office program, courseware for computer literacy, courseware for different subjects, educataiment (education + entertainment) courseware, electronic references, video, overhead projectors, TV, educational videocassettes, and transparencies (Akkoyunlu & Orhan, 2001).

The computer companies sponsoring this project provided one year of free Internet access to project schools. The people living near the schools had a chance to use the Internet during the weekends. The second phase of this project will continue with 3000 schools. In this project some basic principles were accepted for Turkey to move into the 21st century. One of the basic principles was to support formal education through distance education.

Although the Computer-Aided Education (CAE) is not widely used in Turkey, it is served to the schools nationwide (Murphy, 1996). Eskisehir Anatolian University constructed a computer laboratory that is composed of 20-30 computers that are connected with a local network in 14 cities by
synchronized work. With the computer aided studies of Ministry of National Education (MONE) and connection of the computers in the laboratory that is constructed in Anatolia to a national network, the students in Anatolia and big cities will be served great amount of information and they will be able to contact to the students at their level.

There is a great tendency toward web-based instruction programs in most open universities and other educational institutions. Some already have started to offer online degree or certificate programs. For example, Anadolu University has provided online self-test opportunities for its distance learners since 1998. Anadolu University has also been trying to offer some online alternative courses for its oncampus students to be able to understand how feasible, effective, efficient, and appealing it is to offer online programs, and established a foundation for a “virtual” university in 1998. Starting Fall 2001, the University will offer two-year online degree or certificate programs.

As with Anadolu University, some other Turkish Universities are opening online certificate and degree programs. Middle East Technical University (METU), for example, has several online certificate programs on information technology, English language, or computer skills. These programs are similar to METU and Bilgi University, which are private institutions that have been providing an online degree program called e MBA for almost two years. In 1996, Bilkent University and in 2000, Istanbul University constructed the system of videoconferencing.

For example, distance education is performed by F1rat TV programs in F1rat University, some studies are performed using e-mail, and education with WWW through Internet is one of the desired aims. Besides these, there are many serious efforts at other universities such as Sakarya University to open online programs; however, most of these efforts are still at the idea stage of development or are limited to several online courses. Internet home pages become a part of daily life in most of the universities of Turkey, but there are few studies for the usage of Internet for education.

The Higher Education Council (YÖK), a governmental agency, has established a committee called the National Informatics Committee (EMK). Its objectives are to facilitate academic cooperation by enabling the sharing of educational resources among universities; to increase the effectiveness of education by making use of the interactive medium provided by information technologies; and thus increase the efficiency of higher education and its
accessibility to new student audiences. Beyond these, the main goal was to establish a virtual university in Turkey.

**Computer Assisted Education in Turkey**

During the 1980s, as Turkey started laying the foundations for an Information-Based Economy, the problem of having a work force not sufficiently computer-literate became much more apparent.

Thus, the Ministry of National Education (MONE) embarked on an ambitious computer aided education (CAE) project in 1984. The main components of the project were identified as:

- preparing and integrating curricula;
- software design and development;
- training of teachers;
- acquiring hardware; and
- incentives to produce hardware and components locally.

In the academic year 1985-86, as part of the CAE project, 1,111 computers were bought for 101 high schools 10 for pupils and one for the teachers in each school. Two teachers from each school were trained for five weeks. Plus, 130 PCs were bought for 101 tourism and hotel-operation high schools.

Starting in the 1987-88 academic year, these schools introduced a computer-literacy course as an elective with a hands-on component. In the next academic year, 805 PCs were purchased to train pupils in vocational high schools, with some emphasis on hardware maintenance.

The positive and negative aspects of the developments in CAE Project for the 1984-88 periods were the following:
Positive aspects.

- CAE has had a positive influence in increasing pupils’ motivation to learn.
- Involving private firms helped advance the popularity of the CAE concept.
- Training of teachers and administrators in computing gave rise to a core of cadres.
- The awareness of adults about computing was raised considerably.

Negative aspects.

- Software was not developed with compatibility to the curriculum in mind.
- Successfully involving teachers in CAE did not occur.
- Selected teachers were not trained in an adequate fashion.
- Private firms did not provide appropriate hardware and software.
- Private firms’ involvement was below expectations (Yedekçioğlu, 1996).

In 1989, the MOE invited private firms to take part in the CAE Project. A total of 28 firms (17 local and 11 foreign) joined in 50 selected schools. The MONE also invited some universities to take part by training teachers in programming and computer literacy.

By the middle of 1995, a draft of specifications including; hardware, software, courseware, staffing needs, and training outlines was completed; the software evaluation consultant was in place and the fellowship trainees were at a university in the United States. By the end of the year, firms which were to provide hardware and software to the schools had been selected and the Computer Experimental Schools (CES) project was on its way (Schware & Jaramillo, 1998).

The National Council of Education, which convened in May 1996, focused its work on the following five issues to reconstruct the education system in
conformity with the anticipated social, scientific, and technological developments of the 21st century:

1. primary education and its orientation,
2. reconstruction of the secondary education system,
3. re-arrangement of the ways of transition to higher education,
4. meeting the educational needs of society, and

As the project was due for completion in June 1997, a review was planned late enough in the implementation phase to isolate the lessons from the experiment, but in time for any corrective measures to be initiated. With Turkey’s open commitment to information technology in schools, the review assumed the continuance of the project and concentrated on areas of challenge and, improvement.

The World Bank supported project, called the “Project for Globalization in Education 2000” began a very important step for the Turkish Educational System. The aim of this project was to use instructional technology in each level of the education system to be able to create a society with adapted information and technology standards. Through this project, new computer labs were established in 2,451 primary and secondary schools in 80 cities and 921 towns in Turkey. In each of these schools the technology class rooms were equipped with: computers, printers, scanners, office program, courseware for computer literacy, courseware for different subjects, education (education + entertainment) courseware, electronic references, video, overhead projectors, TV, educational videocassettes, and transparencies (Akkoyunlu & Orhan, 2001, pp. 29-31; Usun, 2000, p. 228).

The computer companies sponsoring this project provided one year of free Internet access to project’s schools. The people living near the schools had a chance to use the Internet during the weekends. The second phase of this project will continue with 3000 schools. In this project some basic principles were accepted for Turkey to move into the 21st century. These are:

- to support formal education through distance education;
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- to install computer labs in primary education institutions and provide access for all students to Computer Assisted Education (CAE);
- to make students and teachers computer literate; and
- to equip the schools with modern technological materials.

**DISCUSSION**

Because of the speed with which distance education (open education) was conceived and implemented there have been problems not unlike those faced by other developing countries. Although Turkey considers itself part of the European community, its educational problems place it rather with its Asian neighbors.

McIsaac (1996, p. XXXI) determines that countries like Turkey that have had large scale and successful experience with distance education, can move forward with creative solutions to new problems and it is time for Turkey to capitalize on past successes and look toward becoming a leader in pioneering learning at a distance.

According to the related literature the major problem areas of the Turkish distance education system are the following:

1. Student number excess, insufficiency of class number, the use of computer technology, the delays of registration and examination forms, the appropriate use of transmission tools, and the identification by a computer system.

2. Lack of projects concerned with developing distance education technologies in distance education.

3. Lack of inservice training on the recent uses of the current technology.

4. The budgetary restrictions which confront all developing countries and lack of resources.
5. Designing an effective and suitable learner support system is an important problem for Turkish distance education (Gunawardena, 1996, p. 277).

6. Technologies used to deliver distance education programs in Turkey are typically one-way and she integrates technologies in distance education primarily by combining the one-way technologies with text and television (Murphy, 1996, p. 419).

7. The suitability and accessibility of the radio and TV broadcasts.

8. Low-participation to the face-to-face lessons.

9. Learner-technology interaction is not part of the formal design of Turkish distance education program.

10. Two elements of the Turkish culture; patronage and an oral tradition seem to play a significant role in distance learning even in modern Turkey (Murphy, 1991).

11. Lack of up-to-date technology, lack of program independence.

12. The system is already perceived to be inefficient, inequitable, and of low quality.

There have been many tendencies and attempts to integrate the Internet into Turkish primary, secondary, and higher education systems since 1990. The World Bank supported two projects, “Computer Experimental School” and “Project for Globalization in Education 2000.” The aims were to support the Turkish formal (primary and secondary) education through distance education with the computer-mediated communication network linking. The computer companies sponsoring the second project provided one year of free Internet access to project schools. But, in spite of these attempts and tendencies, because of the slow working, highly bureaucratic, and centralized organization of the MONE in Turkey there is no infrastructure of computer networks for primary and secondary education yet, and the educational uses of the Internet are still in the start-up period.

When we compare with the primary and secondary education, there are more attempts and tendencies to integrate the Internet into Turkish higher
education more than primary and secondary education. Some Turkish universities such as Anadolu University and Middle East Technical University have started to offer web-based online degree or certificate programs such as English language or computer skills. Anadolu University established a foundation for a “virtual” university in 1998.

According to the findings of some studies, the main problems during the use of Turkish virtual classrooms are related to the current hardware, software, and cost constrains. The other problems are more basic, relating to skills helpful in the virtual classroom.

The Turkish universities are most convenient places for the pilot distance education applications because of the infrastructure of their network facilities and the familiarity of the students to the subjects. Although the governmental agency, The Higher Education Council’s aim was to establish a virtual university in Turkey during the 2000-2001 academic year, several courses were offered online but sufficient data was not available regarding the effectiveness and appeal of these courses.

When we compare with other developed countries, the educational uses of the Internet in Turkey are still in the infancy period. The mandatory primary education in Turkey has been extended from five years to eight years. The some problems encountered in the process are expansion, school, hardware and manpower. Distance education and the Internet as a supporting tool and technology are very important alternatives to solve these problems.

With the computer aided studies of the MONE and the connection of the computers in the laboratory that is constructed in Anatolia to a national network, the students in Anatolia and big cities will be served great amounts of information and will be able to contact the students at their level. Although, Internet home pages become a part of daily life in most of the universities of Turkey, there are few studies for the usage of Internet for education.

In spite of initiatives taken by the MONE to promote computer literacy and the use of CAE in schools, from 1984 through 2002, unfortunately, computer education and CAE is still in the early stages of development. The main components of the first project on CAE in 1984, couldn’t be realized yet. Although the first project of The Turkish Ministry of Education was called a “CAE Project,” it has only appeared to use computers in education and schools. In the other projects in 1993 supported by the World Bank called
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“The Computer Experimental Schools (CES)” and “Project for Globalization in Education 2000” the main components and aims also haven’t yet been realized. But these projects appear to be a new future and very important steps for the Turkish Educational System.

In Turkey on the CAE, the major problem areas are the following: the effective planning, the administration of the CAE projects, lack of enough financial resources, lack of adequate software and hardware, teacher training for CAE, the projects and experimental studies on the computer education and CAE.

Through the determined efforts of the MONE, more than one third of the existing 5,851 schools have at least one computer lab. It is clear that the number of computers in schools in Turkey will continue to increase. But, compared with other developed countries, from the point of the CAE projects, applications and studies, Turkey is still at very early stages. As previously mentioned, the main components and aims of the first project in 1984, couldn’t be realized yet. But the second project named the ”Computer Experimental Schools” (CES), is no longer in an experimental stage, the implementation is complete, and all deliverables—hardware, software, and training—are in place. This project undoubtedly will achieve more in the coming years.

CONCLUSION

Compared with other developed countries, from the point of the starting of application; effective using grade; major technologies, and problems (see Appendixes A, B, C [Table 1, Table 2 and Table 3]), we see that Turkey is still in the very early stages. Although Turkey considers itself part of the European community, its problems using instructional technologies place it rather with its Asian neighbors.

Instructional technologies (methods and media) such as distance education, Internet, CAI and computers are very important alternatives to help solve Turkey’s educational and instructional problems. By using those instructional technologies, despite the budgetary restrictions in developing countries, Turkey can solve instructional problems and continue to assist in the modernization of Turkey.
Although Turkey faces problems similar in scale to other developing countries, it has had large scale and successful experiences with instructional technologies and can move forward with creative solutions to the problems of instructional technologies. Despite the insufficiencies and restrictions on the use of instructional technologies, Turkey should seek new ways to use instructional technologies in the most cost effective way.

References


Association for Educational Communications and Technology (AECT) (1977). *The definition of educational technology*. Washington, DC: AECT.


**APPENDIX A**

A Comparison Of Distance Education Between Developed Countries and Turkey

<table>
<thead>
<tr>
<th>Criteria Of Comparison</th>
<th>DEVELOPED COUNTRIES</th>
<th>TURKEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Starting Of Application</strong></td>
<td><em>Nearly 150 years</em>&lt;br&gt; <em>The first known instance of distance education was implemented in 1728</em></td>
<td><em>The best known mega university is Anadolu University founded in 1982</em></td>
</tr>
<tr>
<td>2. <strong>Effective Using Grade</strong></td>
<td><em>Formal and nonformal education</em>&lt;br&gt; <em>Adult education</em>&lt;br&gt; <em>In-service education</em></td>
<td><em>Formal education (Limited)</em>&lt;br&gt; <em>Higher education (Limited)</em></td>
</tr>
<tr>
<td>3. <strong>Major Technologies</strong></td>
<td><em>Two-way interactive technologies interactive</em></td>
<td><em>One-way non technologies of text and TV</em></td>
</tr>
<tr>
<td>4. <strong>Major Problems</strong></td>
<td><em>Reaching more students worldwide restrictions</em>&lt;br&gt; <em>Effective and efficient teaching methods in distance education classrooms</em>&lt;br&gt; <em>Some technological problems (audio and video problems)</em></td>
<td><em>The budgetary</em>&lt;br&gt; <em>Inefficient, inequitable, of low quality system</em>&lt;br&gt; <em>The suitability and accessibility of the radio and TV broadcasting</em>&lt;br&gt; <em>Low participation to the face to face lessons</em></td>
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</table>
A Comparison of Educational Internet Using Between Developed Countries and Turkey

<table>
<thead>
<tr>
<th>Criteria Of Comparison</th>
<th>DEVELOPED COUNTRIES</th>
<th>TURKEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Starting Of Application</td>
<td>* Although the origins of the Internet stretch back several decades, it is only in the last few years that it has really come to the fore</td>
<td>*In 1990 first computer network connection</td>
</tr>
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<td></td>
<td></td>
<td>*In 1996 Internet has touched education sector</td>
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<tr>
<td>2. Effective Graduate</td>
<td>*Formal and nonformal education</td>
<td>* Formal education</td>
</tr>
<tr>
<td></td>
<td>*Adult education</td>
<td>*Primary and secondary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Inservice education</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Major Technologies</td>
<td>*Collaborative surving</td>
<td>*Limited applications in some universities</td>
</tr>
<tr>
<td></td>
<td>*CMC</td>
<td>*E-mail</td>
</tr>
<tr>
<td></td>
<td>*Audio/Video conferencing</td>
<td>*Web pages</td>
</tr>
<tr>
<td></td>
<td>*Webpages</td>
<td>*WWW</td>
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<tr>
<td></td>
<td>*Streaming audio and video</td>
<td>*Online programs</td>
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<td></td>
<td>*Java and activex</td>
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<td></td>
<td>*Virtual reality and courses</td>
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<tr>
<td></td>
<td>*Chatrooms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Whiteboards</td>
<td></td>
</tr>
<tr>
<td>4. Major Problems</td>
<td>*Effective using of Internet assisted and Internet-based courses</td>
<td>*Efforts in some universities are still the idea stage of development or are limited to several online courses</td>
</tr>
<tr>
<td></td>
<td>*Designing Internet materials for courses</td>
<td>*Few studies for the educational uses of Internet</td>
</tr>
<tr>
<td></td>
<td>*Student fear and/or lack of knowledge about Internet</td>
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APPENDIX C

A Comparison of Computer Assisted Education Between Developed Countries and Turkey

<table>
<thead>
<tr>
<th>Criteria Of Comparison</th>
<th>DEVELOPED COUNTRIES</th>
<th>TURKEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Starting Of Application</td>
<td>*1970' years</td>
<td>*1984</td>
</tr>
<tr>
<td>2. Effective Graduate</td>
<td>*Formal and nonformal education</td>
<td>*Formal education (Limited)</td>
</tr>
<tr>
<td></td>
<td>*Adult education</td>
<td>*Primary, Secondary Higher education (Limited)</td>
</tr>
<tr>
<td></td>
<td>*Inservice education</td>
<td></td>
</tr>
<tr>
<td>3. Major Technologies</td>
<td>*Two-way interactive technologies</td>
<td>*One-way non interactive technologies</td>
</tr>
<tr>
<td></td>
<td>*Many different computer platforms and operating systems</td>
<td>*Microcomputer using</td>
</tr>
<tr>
<td></td>
<td>*Multimedia and hypermedia</td>
<td>*Prepared courseware using</td>
</tr>
<tr>
<td>4. Major Problems</td>
<td>*Researches are inconclusive regarding the comparative effectiveness of conventional instruction alone</td>
<td>*Effective planning</td>
</tr>
<tr>
<td></td>
<td>alone</td>
<td>*The administration of CAE projects and CAI lack of enough financial resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Teacher training</td>
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<tr>
<td></td>
<td></td>
<td>*Qualified hardware</td>
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<tr>
<td></td>
<td></td>
<td>*Effective software and courseware for CAI</td>
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</tbody>
</table>