Higher Education Provision for the Hearing Impaired and Internet Based Education in Anadolu University- ANAPOD

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Abstract: - Today, in every field of our lives, an efficient information access and mobility has become a prerequisite for the sustainability of all systems. Considering this fact, Internet technology has become the fastest and the most proper media to access the required information worldwide, from our daily questions to scientific researches. Within this rapid development, many Internet compatible applications have been specialized to ease information access and sharing. Increasing demand and applications for web based education services instead of traditional education methods are also one of the reflections of this rapid development. Internet based education models integrated with computer technologies provides the best and most efficient conclusions for mass education process.

To meet the mentioned demands and needs, Anadolu University, has been providing higher education opportunities through distance education since 1982. ANAPOD project, which was initiated in November 2007 has been providing a new educational content production model within University’s distance education process. ANAPOD has been proven to be highly applicable to many disciplines. In the year of 2009 School for the Handicap decided to join to the ANAPOD project group for the higher demands of the hearing impaired students. In this paper, ANAPOD project and higher education provision for the hearing impaired students in Anadolu University will be discussed.

Key-Words: - Special Education, Hearing Impaired, Hearing Aids, Internet Based Education

1 Introduction

Adaptation of individuals to the society and their academic success are mostly empowered through fluent and efficient use of communication channels. The core of interpersonal communication is language and its verbal dimension, speech [1; 2]. Speaking is one of the most widely used ways of communication modes in interpersonal communication. Children acquire their native language and its verbal channel, speech, through their hearing ability starting from birth. They start using language for communication in an efficient and fluent manner in a short span of time, i.e. three to four years. Hearing carries an important role in the acquisition of speaking skills [3]. However, hearing loss present before birth or during the first year of life severely interferes with the acquisition of the mother tongue and speech [4]. When this happens, the chance to acquire the culture of his/her society and intellectual development is reduced for the child who experience hearing loss [5]. Such problems lead to defects in communication process of children with hearing loss [6].

In order for speech production to occur, feedback from interconnected sensorial channels should be perceived sufficiently [7]. Through this feedback, speakers can control their voice along with segmental and suprasegmental features of their speech, and correct their mistakes. In order to realize this function, a speaker primarily relies on the hearing channel (Rabin et al., 1999). Insufficiency or total lack of aural feedback stemming from sensory-neural hearing handicap leads to defects in the ability to notice and correct their own speech deficiencies and mistakes. As a result, speech patterns of individuals with hearing loss deviate from that of the non-hearing impaired. Studies revealed that segmental errors occur in the production of vowel and consonant phonemes [8; 9; 4].

Children with hearing loss should be equipped with hearing devices so that they can improve their listening, speaking and language abilities starting from an early age and both the children with hearing loss and their families should be supported in instructional settings. This need should lead to the development of appropriate
programs so that they can use their residual hearing abilities in an efficient way [10; 11]. While developing such programs, positive attitudes of families and teachers towards hearing impaired children, the cooperation between teachers and families, and having high expectations carry utmost importance [12; 5].

The ultimate aim of the auditory oral approaches is to equip children with hearing impairment with both intelligible speech skills (i.e. production) and listening comprehension (i.e. reception) [11; 13; 14]. Auditory oral approaches based on intensive auditory and oral practices facilitate hearing impaired children’s lives in the hearing society. Besides, these approaches help children with hearing impairment speak intelligibly and fluently and reduce the problems they face in hearing society [15].

Today’s technology have provided hearing-aid and listening devices which help hearing impaired children acquire their native language like hearing children. These devices have been developed through using the residual hearing appropriately and exposing hearing impaired to appropriate language experiences. However, in order for both hearing and hearing impaired children to acquire the language, they should be supported with appropriate listening and speaking experiences, where appropriate assistive listening devices are used.

Whatever the hearing impaired child has been acquired his/her mother tongue, he/she has to develop high quality intellectual and academic skills. These skills can only develop in perfect educational settings and with perfect educational tools. The aim of the education is to reach efficient knowledge and information.

The key concepts of today’s information community are “to learn how to learn”, “to learn how to choose” and “to know how to manage the necessary information”. Depending on the changing conditions and growing technology, the main objectives of an education environment can be as follows:

- To be able to handle increasing information sets,
- To ease education process,
- To encourage and develop participatory and individual education,
- To create efficient methods for developing and evaluating education

Distance education is a type of education where students and lecturers may appear at different places during the whole or a part of the process, thus space and time independences are provided, and where the education environment is made up of advanced telecommunication media bringing the lecturers, students and lecture materials together for an interactive and participatory education.

Since Internet is in use by the year 1992, accessing information in a global scope became much easier. Also educational resources in a wide range and varying quality could easily and freely be reached by people [16]. The rapid increase in the number of Internet users motivated the growth of an enormously active web related industry. An amazing advancement in information technologies, software development processes and the telecommunication field has also influenced the traditional education contexture. Positive features of the Internet, such as easy and fast access and sharing opportunities, download and uploading capabilities, easy to find hardware and software requirements and utilization simplicity encourage the development of Internet based education methods as well. In course of time, the use of Internet as a teaching and learning medium has become widespread and online provision of educational contents have increased. For sophisticated societies, sharing information is a component of their educational strategy. The fundamentals of open courseware materials and open educational resources have grown in the context of the thought: "sharing the knowledge increases and develops the knowledge."

2 Hearing Aides

Hearing aids are initial technology used to access sounds for hearing impaired person. Hearing aids do not actually correct the hearing loss. They amplify and shape the incoming sounds to make sounds audible to the impaired person. Hearing aids can be classified as behind the ear hearing-aids, in the ear hearing-aids and in the canal hearing-aids [17].

In today’s technology is provided different kind of hearing aids to the hearing impaired person according to his/her hearing loss and needs such as digital or analog hearing aides?

3 Assistive Listening Devices

Listening condition of the environment is important to the hearing impaired person, such as noise, distance from speaker and reverberation or echo which can not be solved with hearing aid alone [18]. Because clear and complete speech signal is so important to develop expressive language and reading skills, improving listening environment in all of the students learning domains [13; 19]. Assistive listening devices are designed to solve this problem.

There are many kinds of listening devices ranging from listening devices to telephone devices and alert/alarm devices. The most relevant assistive listening device to the educational situation is personal worn FM systems and Sound field FM an IR (classroom amplification) systems.
4 Cochlear implants
A cochlear implant is a surgically inserted biomedical device designed to provide sound information to children adults who experience severe to profound hearing loss [20].

5 Hearing Impaired Education in Anadolu University
Anadolu University is one of the pioneering universities in the education of hearing-impaired children and hearing impaired teacher training programs in Turkey. Hearing-Impaired children education program started in 1979 for research purposes of and as a model school. Teachers’ of hearing-impaired children training program was also started in the Faculty of Education in 1981. Also an undergraduate college for hearing-impaired students was opened in 1993.

6 Education and Research Centre for Hearing Impaired Children (İÇEM)
This centre, abbreviated as İÇEM, was set up by Anadolu University as a progressive auditory/oral educational program for the hearing impaired children with an aim to be a model school of its kind. Starting in 1979 as a very small pre-school program, it has gradually developed into a fully comprehensive service, encompassing early diagnosis of hearing loss, hearing aid fitting and maintenance, cochlear implant pre and post assessment and programming, parent guidance, integration facilities and a special school with nursery, primary, secondary schools and general lycées departments leading to university entrance.

At present, two professionally trained audiologists, 43 teachers, 11 assistant teachers are full time members of staff. 134 hearing impaired and 37 hearing - a total of 171 students attend the school on a regular basis. Two etiology clinics provide diagnostic services for referrals made from all over Turkey.

İÇEM, with all its clinical unites and departments is an institution on its own, but at the same time provides a practicum experience for the students from the Faculty of Education who is being trained to become teachers of the hearing-impaired. İÇEM teaching staff members also lecture at the Faculty of Education on their 4-year teacher training program. Short term, in-service training programs are run by the members of the Centre for teachers of the hearing impaired employed by the Ministry of Education.

7 School for the Handicapped
This program was established in 1993. There are 150 hearing impaired students enrolled at this school. Sign Language is not used within the university however students are free to communicate in sign language.

This two-year degree program is modified to accommodate hearing impaired students who are allowed to complete the program in three or four years. There are currently four career choices: Computers, Ceramic Arts, Graphic Arts, and CAD.

School for the Handicapped started during 1993 academic year. The aim of the school is to offer special education for the handicapped in vocational programs and thus enabling them to become productive members of the community. The Department of Applied Fine Arts offers undergraduate programs in both ceramic arts and graphic arts. Department of Administrative Vocations and the Department of Architecture offer two-year degree programs in computer operator training and architectural drawing. These departments are equipped with the necessary technological aids to accommodate the educational needs of the hearing impaired. Students are provided with the latest audio visual teaching aids, PC and MAC laboratories and access to the internet [21].

8 Internet Based Education (ANAPOD) in Anadolu University
Anadolu University has been providing higher education opportunities through distance education since 1982. Anadolu University, with over 3 million distant students is one of the leading Universities in Turkey.

After the introduction of Internet to the public early 1990s, Internet based distance education has been one of the popular applications running on the web. However, first attempts did not provide audio visual content to students. As the bandwidth of Internet backbone increases and peer networking technologies spread around the globe, 2000s mark the appearance of the audio content on the web. In those ears, voice of IP, MP3, Internet telephony and audio compression tools became the buzz words in the technology area. On the other hand, video broadcasting technologies over the web began to gain popularity. A number of research studies on the video compression and streaming technologies, such as MPEG4 and H.264 compression algorithms, can be noted for conveying digital information over limited bandwidth backbones. Year 2007 is known as the beginning of the Internet enabled mobile device era. Mobile units, such as iPhone, iPod touch, Microsoft Zune, Sony PSP are some of the
successful devices that provide multimedia and Internet experience to their users.

In 2004, Anadolu University initiated an effort to produce online course materials. Due to the complexity of the authoring software, the initiative failed to acquire a satisfactory adoption rate among lecturers. Moreover, additional time and skills were needed to prepare for the deployment of materials on the web. Another approach was to capture class hours on the video using professional staff that is in charge of preparing materials for the distance education programs of Anadolu University. A crew was formed to edit the video material and to encode with sufficient quality for the web. However, the production rate of the crew was not sufficient to record many lectures in a short time.

Experiences in the production of online materials have revealed that the system for the acquisition of class materials has to be prepared by the lecturer. Such a system should not require a high level technical expertise and can be run by a regular computer user. It was observed that if a computer desktop screen was captured in full motion together with the sound input from a microphone, a sufficient recording environment could be satisfied. Recording can be accomplished on a computer, but encoding and publishing on the web should be automatic and provide by high speed server clusters due to the high computational requirements of video encoding process. In the search for a better system, Apple Corporation’s newly introduced operating system, Leopard, was beta-tested in 2007 and was realized that MacOS v10.5 (Leopard) podcast server coupled with a sizable storage system can satisfy the requirements for a large scale course material recording and encoding project. The podcast producer system, which is embedded inside the operating system, enables the user to capture the screen and other video resources in full motion, and transmit to the encoder system over a network enabled Mac computer. The material, after the encoding, is published in the blog site of the course. The Wiki technology eases the process of appending and modifying the course material.

In August 2007, installation of a Mac server cluster having a 28TB of storage was finished. In October 2007, following the release of Leopard operating system, the server cluster is updated with the new operating system. At the end of 2007, a 100 Mbps of Internet connectivity was established and dedicated to the system. Several tests were applied on the system and bugs were resolved. The project is named as ANAPOD and http://anapod.anadolu.edu.tr address was given to the system. When the podcast producer system was stabilized after a series of patches released by Apple Corporation, a team of academic staff from various technical and social sciences backgrounds was formed by the rector of Anadolu University in April 2008. A technical support team was also established to train the academic staff and manage the system. Two day training was held to get the team members acquainted with the MacOS operating system and podcast production environment. A series of meetings were also organized to assess the progress and to resolve technical and operational difficulties. These meetings provided the list of required devices that can be used in the project as follows:

1. A HD (High Definition) camera (60GB hard disk) with firewire connection
2. HD Visualizer
3. Professional wireless audio device
4. Omni directional microphone
5. Noise reducing USB microphone

Until the summer of 2008, team members were successfully prepared contends for eight courses. This pilot project has proven that ANAPOD equipment can be effectively used to produce online materials. Some of the teaching techniques that are supported by the system can be summarized as follows:

1. Recording the presentation with presenter’s voice
2. Recording the presentation with presenter’s live video through web camera and voice
3. Taking video during the class hour using HD camera and wireless audio equipment
4. Playing educational DVDs on the screen and capturing the screen with presenters voice
5. Recording the talks of the expert people invited for conferences
6. Taking the video of the key lab sessions
7. Recording online chat with students
8. Recording problem solving activity on papers using visualizers.

In October 2008, the University administration decided to extend the project scale and started a large scale initiative to use the system for course material production. A number of new programs to supplement the current distance education mainstream with new technical and engineering programs.

9 Conclusion

Today’s technology have provided ear-aids and listening devices which help hearing impaired children acquire their native language at the same way hearing children acquire it. These devices have been developed to supplement hearing appropriately by using the residual. However, in order for both hearing and hearing impaired children to acquire the language, they should be supported with appropriate listening and speaking experiences, where appropriate assistive listening devices are used.
Although hearing impaired students can acquire good aural language and reading skills they need to overtake to knowledge and lecture materials easily so they could reinforce their knowledge. At the same time by means of ANAPOD they could get visual, written audio information lectures. We believe that Internet based education (ANAPOD) will be extend their knowledge and experience to reach information.

The method and the tools explained in this paper provide an efficient and an easy-to-handle Internet based education environment for both lecturers and students, which also ease and without any difficulty whole lecture materials and project evaluations are shared online. Hence, the method discussed in this paper, is an important asset for the preparation and broadcasting of Internet based education lecture materials for the hearing impaired students in Turkey. With this application, sharing among the schools becomes more effective and so the education quality is increased in the country. The most significant feature of the system is its simplicity. Anyone with basic computer knowledge can produce content. Compared to the fixed videoconference systems, mobile lecture materials can be more easily prepared with this method without the help of an operator or a system director. The installation cost is considerably low and system complexity is encapsulated within the server system keeping the production environment simple for the user.

References: