

A system for e-inclusion for individuals with sight disabilities

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Abstract: - This paper presents in detail the structure of an integrated tele-informing and tele-education system (web portal), which was created for the needs of disabled individuals and especially for those with visual impairments. Particular emphasis was given to the special access methods of these individuals to the portal, in order to create a user-friendly environment for the users. This meant that these access methods had to fulfill the principles of "Universal Accessibility" as well as "Design for All", in an effort to ease the integration of these people into ICT. In addition, the informing and training of the disability specialists, constituted a primary aim of this project, since the upgrade and enrichment of the specialist's knowledge, indirectly upgrades the actual training of the disabled individuals.

Key-Words: - E-inclusion, ICT, Disabled Individuals, Audio Messages, Sight Disabilities, Web Portal

1 Introduction

Nowadays, the access to information constitutes the most undeniable right of all people (Goggin 1982). In the contemporary era of information and fast developments, where the media is digitized, the need to improve the Internet, digital TV and other interactive services usage techniques for disabled people and especially for the visually impaired, becomes more and more apparent and essential [2,4,5,7]. The World Wide Web may constitute an inexhaustible source of information and entertainment for the majority of people but for the disabled it is a completely different matter. Unfortunately for many years if not decades, it has remained a distant and forbidden treasure.

On the brighter side, there is strong international activity regarding the adjustment of the Internet to the needs of these people, through the use of special technological applications in the already existing communication mediums. Numerous research centers from various countries have moved towards this direction with very important contributions. [8,9,12,13]

The aim of this project is the creation of a model portal environment for informing and educating disabled people and especially the visually impaired with easy access and easy navigation for both disabled people and other interested parties. [1,6,13,15,16,17,18] That is to say, that the portal has to comply with the principles of "Universal

Accessibility", "Assistive Technology" and "Design for All" for the benefit of the disabled ensuring their access to information, knowledge, education, and even to work.[7,12,14]

In addition, this project aims at the development of a distance learning and tele-education system for the specialists so that the new network techniques are used for the enrichment of the specialist's knowledge, aiming at the improvement of the education quality of the visually impaired and the disabled individuals in general. [5,16]

Moreover, another important aim was the usage of new multimedia applications of data listing for the recording and registration of the educational and therapeutic work as well as the served incidents, so that the trainers work in favor of the visually impaired individuals, is upgraded.

Finally, there is the continuous effort to conciliate the disabled in general, with the computer and ICT through special supportive technological equipment and contemporary web design methods, in order to render these people equal members of the information society. [6,8,15,17,18]

2 Abstract Level Description

This informative and educational system for the visually impaired comprises two main units. The Web Portal itself and the Multi-Subject Database, as

it can be seen in the following Fig.1 and are analyzed separately next:

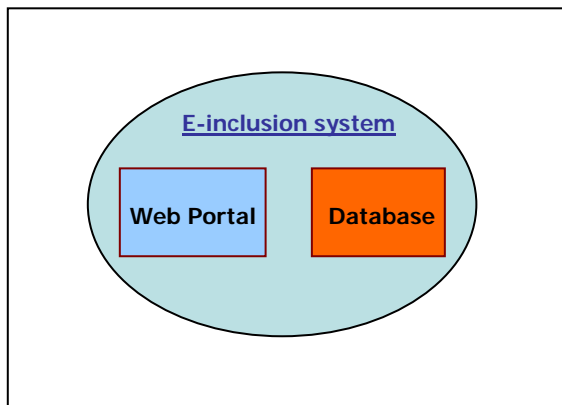


Fig.1: Abstract Level System Analysis

2.1 The Web Portal

A web information portal for the disabled individuals, with access possibilities by blind individuals and individuals with severe sight problems, was created. This specific portal is the first such portal in Greece for disabled people that uses alternative access methods so that the disabled individual has the possibility of easy access to the Internet and hence, to information.

The portal includes technological as well as general information about the disabled individuals and it is based on the multiple access menus, which will be determined according to the disability of each individual. This way the portal fulfils the principles of "Design for All" and "Universal Accessibility", which were mentioned earlier. The access methods include audio navigation, the possibility of enlarging the text for easier reading and finally, access that is based on a common menu and is addressed to normal citizens, the trainers and the families of the visually impaired individuals.

2.2 The Multi-Subject Database

A multi-subject database to be used by the trainers of the visually impaired individuals was created, aiming at the scientific evaluation of the quality of the services that are provided to disabled individuals. This database constitutes a source of information as well as a database for the trainers of a certain disability centre, which refers to the history and the progress of the special education of the visually impaired individuals. In particular, all the information that regards these people as well as the centres events are inserted into the database. In addition, the therapeutic and educational work of the employees of the centre is inserted into the database

as well as the corresponding profile of the served population.

3 System Analysis

This section presents the actual Web Portal by dividing it into the Index page and the Main page. The main page is then subdivided into its two menus which will be analyzed in detail as follows:

3.1 Unit 1 Analysis

The portals index page guides the user as to the special tools that the user will need in order to use the portals services. These are the Macromedia Flash Player and Real Player [10], which can be downloaded for free from the correspondent links on the index page. After this task, the user may enter the main page of the portal, by simply clicking on the link Enter, as it can be seen in the following Fig.2:

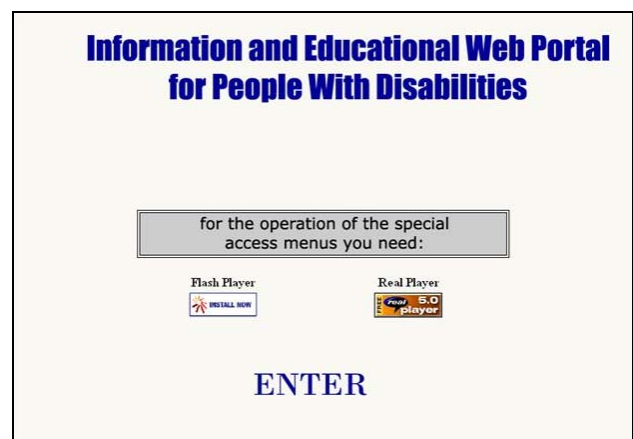


Fig.2: The Index Portal Page

3.2 Unit 2 Analysis

Once the user has entered the main page which is depicted in the following Fig.3, the audio message can be heard and the moving image can be seen. This confirms the correct installation of the aforementioned Macromedia Flash Player and Real Player tools.

The main page of the portal includes the portal information access menu. By choosing one of the two access menus, namely, Common Menu and Audio Navigation Menu the corresponding page structure will appear. For the visually impaired individual there is an audio message that welcomes and instigates the user to press one of the 1,2 keys in order to be navigated to one of the two aforementioned menus:



Fig.3: The Main Portal Page

3.2.1. Common Menu

In this menu, the non-disabled interested individuals may navigate through the information of the portal through columns of links as happens in a normal portal. In addition though, through the installation of a special Flash Player plug-in, which is provided free of charge on the Internet, the user may enlarge both the graphics and the text [3]. The enlargement process, which is given sonically by navigating the user to the corresponding menu, is realized by right clicking the mouse and choosing zoom in. For further enlargement one chooses zoom in again, while for returning to the initial font size the user chooses zoom out. This menu's possibility is due to the special design of the web pages using the Macromedia Flash 5 tool.

As it can be seen in the following Fig.4, there are four units in this page namely, Technology, Information, Organizations and Multimedia.



Fig.4: The Common Menu

The unit "Technology" contains information about technological supportive tools for individuals with visual and mobility impairments. Each of the four

links namely "Braille Terminals", "Supportive Tools", "Screen Readers" and "Special Browsers" loads a page containing a list of links of the most important technological supportive tools available, mainly in Greece.

The unit "Information" contains information that interests disabled people. There are four links namely "Bibliography", "Magazines", "Greek and Foreign Links" and "Medical Guide", which load pages containing books on disabled people according to the disability, magazines and links to Hellenic libraries where these magazines can be found, hyperlinks of the most important Hellenic and foreign sites that engage in disabilities issues and finally information about injuries and causes of child eyesight loss.

The unit "Organizations" contains information about all the institutions and organizations related with disabilities in Greece and especially those which were implicated in this project.

Finally, the unit "Multimedia" contains educational and recreational material for both the disabled people as well as their trainers. More analytically there are six links, which perform the following tasks:

The link "Video" opens a page which contains various digital videos of educational activities taking place at disability centers according to the thematic of the activity as well as links to these videos.

The link "Video on Demand" opens a page with the Video on Demand service using the IP-TV Viewer 3.0 and the links to the corresponding videos.

The link "Audio Books" opens a page containing ten excerpts from Audio books provided by the Pan-Hellenic Blind Association that are available in Real Audio.

The link "Music Links" opens a page containing Hellenic and foreign links to radio stations on the Internet and also to music web sites.

The link "Tele-Conference" opens a page which provides the necessary guidelines and the necessary links for the attainment of tele-conference.

Finally, the link "Database" opens a page with the database for the trainers, which was created in the framework of this project.

3.2.2 Audio Navigation for the Visually Impaired

Here, the visually impaired individual is navigated through audio messages (Real Audio) to audio information only. This means that the installation of the Real Player tool is essential for the navigation of the visually impaired user. The navigation through the pages is realized by pressing the keys according to the instigation of the corresponding audio message. The keys that are used are “enter” to return to the root menu page, “space” for returning to previous pages and the numerical ones “1-9” for the navigation through the pages, as it can be seen in the following Fig.5.

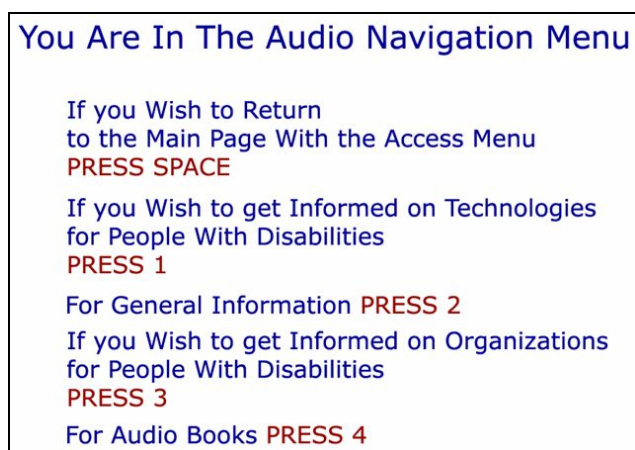


Fig.5: The Audio Navigation Menu

Once the web page is loaded, an audio welcome and navigation message is heard, for the visually impaired individual. The activation of the keys was realized with JavaScript, while the audio navigation was realized with the generation of real audio messages and their incorporation in a page through the special Real Player plug-in.

The thematic units are exactly the same as the ones in the common menu except for the multimedia ones (video, video on demand, video conference and music links) for the obvious reason that they cannot be used by the visually impaired. The only multimedia unit that is present is the audio books.

4 Conclusion

Having experienced concepts such as tele-conference, e-mail listing, newsgroups, IRC rooms, computer assisted instruction and e-commerce, which undoubtedly justify the Internet definition as an “Information and Communication Society”, one easily wonders if this world is equally open and friendly to disabled individuals.

The answer is absolutely positive. The technological evolution in the digital technology and networks area nowadays may provide the unique opportunity to disabled individuals to participate actively in the Internet and its multiple services. At a low cost these people have the unique opportunity to communicate with the Internet community worldwide as well as with other disabled individuals rendering their disability “invisible”. This way they ensure their access to information, knowledge, education, participation in social activities and in many cases even to work under equal conditions.

However, it is necessary to mention that the Internet is merely a tool which can only reduce but under no circumstances eliminate the problems and this is the context in which it should be used.

The main aim of this project was to develop a special informative and educational system on the Internet that is adjusted to the needs of a visually impaired individual as well as the needs of the specialist-trainer. It was essential to simplify as much as possible the issues that surround universal ICT access, so that the disability is never seen as a barrier. The need to integrate these people in the main stream of life is ubiquitous and long overdue. Proceeding matters under the context and the belief that disabled people are not really disabled but “differentially able”[11], this project steadily started becoming a new reality especially for the Hellenic people.

It is true that disabled people in general possess talents, which others do not and only have to be exploited in order to surface. The difficulties and parameters that had to be taken into account were numerous and complex. The integration of these people into the society as full and equal members through ICT requires time and effort, which in return will yield the security and satisfaction that the disabled people are no longer considered second class citizens of our world.

References:

- [1] Karen Nakamura, Creating Accessible HTML (<http://www.deaflibrary.org/accessibility.html>)
- [2] Stanley Debono, Michael Micallef, Foundation for Information Technology Accessibility, 2004
- [3] Best Practices for Accessible Flash Design <http://www.macromedia.com/resources/accessibility>

- [4] A.S.Drigas, J.Vrettaros, D.Kouremenos, Teleeducation and e-learning services for teaching English as a second language to Deaf people, whose first language is the Sign Language, *WSEAS Transactions on Information Science and Applications*, Issue 3, Volume 1, September 2004.
- [5] A.S.Drigas, J.Vrettaros, L. Stavrou, D.Kouremenos, E-learning Environment for Deaf people in the E-Commerce and New Technologies Sector, *WSEAS Transactions on Information Science and Applications*, Issue 5, Volume 1, November 2004.
- [6] Lawrie Phipps, Allan Sutherland and Jane Seale, *Access All Areas: disability, technology and learning*, JISC TechDis Service and ALT, 2002
- [7] Gerry Stallard, *Standardisation Requirements for Access to Digital TV and Interactive Services by Disabled People*, JUNE 2003
- [8] Nancy J. King, *Website Access For Customers With Disabilities: Can We Get There From Here?*, 2004
- [9] *Affecting Change and Influencing Government Policy for Excluded Learners*, IPLD, Socrates Grundtvig, 2005
- [10] RealPlayer, <http://www.real.com/>
- [11] <http://www.dirf.org/ictd.htm>
- [12] <http://www.hi.se/Hi/Internat/eoi/FP6%20EoI%20Working%20life%202002.pdf>
- [13] Accessibility: Making ICT Available to Everyone, http://www.jisc.ac.uk/uploaded_documents/ACF3E3.pdf
- [14] Guy Dewsbury, Karen Clarke, Mark Rouncefield, Ian Sommerville, Bruce Taylor, Martin Edge, *Designing Technology In Homes To Meet The Needs Of Disabled People*
- [15] Doria Pilling, Paul Barrett and Mike Floyd, *Disabled people and the Internet Experiences, barriers and opportunities*, 2004 by the Joseph Rowntree Foundation
- [16] A.S.Drigas, An e-learning environment for the training of instructors of individuals with multiple disabilities, *Infosystem 2004*. Salonica 10/2004
- [17] A.S.Drigas, Informative and Educative System for disabled people, AMEA Meeting: Equal access to the information society, to education and to employment. *Park hotel Athens* 29/3/2001
- [18] A.S.Drigas, Informative and educative system for disabled people, General Secretariat of Youth Meeting: Development of New Technologies for the Support of Disabled people *E.I.E. Athens*. 12/6/2001