PROSPECTS IN COMPUTER-ASSISTED TRAINING FOR THE PERSONS WITH DISABILITIES

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Abstract: We assist to great changes in informatics area and education became dependent by the information’ technologies. Lately has been increasingly more emphasis on creating assistive technologies, in particular direction followed by Microsoft. Latest version of the operating system from Microsoft, Microsoft Vista demonstrates this. It has brought considerable improvements in terms of voice recognition (with an achievement degree of over 95%), aiming at further developing this category of software. Microsoft implemented in Windows XP operating system the Accessibility Options, which allow users to set certain options for assisting them. The same functionality has Ease of Access in Windows Vista. This article’s purpose is to contribute to a better understanding of assistive software necessity in computer-assisted training for the persons with disabilities. Persons with disabilities have difficulties in interacting with the computer using conventional procedures, it’s therefore useful to develop software with high accessibility and appropriate peripheral categories of disabilities.

Keywords: disabilities, accessibility, assistive products, standards of accessibility, API, SAPI.

I. INTRODUCTION

Computer assisted training is a modern variant of higher education which doesn’t exclude traditional but offers a perspective of improving the methods and specific means of training. Interactivity is the key element which revolves around learning.

For persons with disabilities, accessibility is particularly important because the learning must be closely related to assistive technologies which facilitate access to information that is transmitted.

New technologies offer a perspective in achieving educational content and its transmission and access.

II. ACCESSIBILITY IN TRAINING PEOPLE WITH DISABILITIES

The access to education and new technologies for the persons with disabilities is the main objective of the action plans initiated at EU level but also at the level of our country. These concern access to education through access to new technologies and information. It is the Web accessibility and persons with disabilities access to Web content, especially since the Web has an increasing role in trade, in training and in finding a job. Web services represent an opportunity for people with visual, mobility, hearing, cognitive or speech disabilities, if these are available. There is a link between accessibility and usability. In this case accessibility can be defined as a characteristic of products and services informatics which facilitate their use by persons with disabilities. Accessibility Web sites remains a problem to be solved especially for sites that don’t use the XHTML markup or which have a multimedia content and to be modified require additional effort. That's why in a site which is accessible to any person should take account of accessibility standards.
2.1 Standards of accessibility in web sites

For persons with disabilities the access to web sites relate the access to content sites, namely the existence of a Web design that enables them to understand, navigate and effectively interact with the web pages. Many sites remain inaccessible to these persons because the software doesn’t support Web accessibility properly and web developers don’t know or ignore international standards of accessibility. The content standards’ accessibility is carried out by the W3C (World Wide Web Consortium) what promote interoperability, web development and especially its universality.

WAI (Web Accessibility Initiative) which is supported by a number of governments has as working levels:
- developing guidelines and tools for assessment of accessibility;
- ensuring that Web technologies support accessibility;
- education and research.

WAI recommends three sets of guidelines which have a basic role in delivering Web accessible (figure 1):
- WCAG 1.0 (Web Content Accessibility Guidelines);
- UAAG (User Agent Accessibility Guidelines);
- ATAG (Authoring Tools Accessibility Guidelines).

These guidelines explain how to use Web technologies so that you can create accessible Web sites.

Web sites contain applications more or less complex. These include educational content, which runs on a Web server and is accessed through a browser by several users. It provides such information and their training.

![Accessible Web’s components (WAI)](image_url)
2.2 The accessibility from operating system

Windows operating system provides accessibility to persons with disabilities through Magnifier utilities (which allows viewing screen portions at increased scale), Narrator (application guides the user in working with programs from Control Panel, Internet Explorer browser or Note Pad and WordPad) and On-Screen Keyboard (displayed as screen keyboard). In Windows Vista, Ease of Access Center is the location where can be adjusted the accessibility settings and programs for accessibility. Internet Explorer 7 has the best compatibility with assisted technology products and new accessibility features.

Accessibility features are offered by Office package as zoom effects, contrast between graphics elements increased visibility at the documents’ content including the design of accessible Web pages which combine text with images.

2.3 Assistive products

For additional access in working with computer have been created assistive products for users with disabilities. These addressed each type of disability and allow using the computer by other means than the standard keyboard or mouse. From electronic indicator devices to systems enabled by breath-inspiration or using voice for computer data entry, these products successfully replaced peripheral input devices.

A group of them (figure 2) may be as follows:
- Alternative keyboards (keyboards for use with one hand, alternative key configurations);
- Augmentative communication aids (software that speaks text aloud for someone through their computer);
- Augmentative communication devices (a hand-held device that speaks aloud for someone who has difficulty speaking or being understood by others);
- Braille embosser/printer;
- Electronic pointing devices (such as those used to control the cursor on the screen using ultrasound, eye movements, nerve signals, or brain waves);

![Assistive Products](image)

Figure 2- Assistive products

- On-screen keyboard programs;
- Reading tools for learning disabilities programs (text highlighting and text tracking);
- Screen magnifiers;
- Screen readers;
- Sip-and-puff switches;
- Speech training software;
- Talking word processors;
- Trackball;
- Voice recognition products;
- Word prediction programs;

Among these the speech recognition and speech synthesis are very important because address to several types of disabilities.
III. ACCESSIBILITY TECHNOLOGIES

According to studies made by specialists (example Microsoft) a relatively large number of people who use computer have some difficulties inherited or acquired during their life. Should be granted such a need for increased attention from software developers in delivering interfaces and how users can use these programs.

3.1 WINAPI Technologies

SAPI (Speech Application Programming Interface) model is specific to Windows operating systems enabling voice recognition and text processing in the voice signal. SAPI is implemented as a series of COM (Component Object Model) interfaces and comprises two distinct levels:
- SAPI high level, which allows access to basic services of voice recognition by Voice Command object and outputs simple text to speech by object Voice Text;
- SAPI low level, which provides access to detailed Windows services voice recognition by SR Engine Enumerator, SR Sharing objects and converting text into voice signal by TTS Enumerator objects, respectively TTS Engine.

Low SAPI services level is useful in implementing evolved voice recognition and text to speech services.

3.2 Accessibility in Visual Studio.NET

The developed technology by Microsoft, called Active Accessibility, improves the way which the operating system and programs interact with accessibility features. The programs developed using Active Accessibility provide compatibility between developers’ products and developers’ assistive software and support greater flexibility in designing user interfaces. For example, a feature is the Braille bar. Other features are the zoom of the screen, the screen readers (for persons with visual disabilities), or taking over voice controls. Active Accessibility provides dynamic libraries (Dynamic Link Library) which are incorporated into the operating system and provides standard COM interfaces, API elements and classes of the platform. NET, which works with user applications increasing their portability. The applications using standard user interface doesn’t require special developments from the user.

IV. APPLICATIONS REQUIRED TO COMPUTER ASSISTED TRAINING FOR PERSONS WITH DISABILITIES

In computer-assisted training for making necessary software products should be a compatibility between the technologies used and the assistive tools. From existing international trends about applications for training people with disabilities is notable trend tutorial that applications must be designed at the level of learner. These applications must be consistent with the principles of assistive design, namely: consistency and flexibility in implementing the interface, compatibility with assistive services and presenting the results in different formats (text, video, graphics, audio, or combinations of these).

The main objectives which must follow the available software developers are:
- to provide an adaptable interface to a wide variety of users according to their needs and preferences;
- the software must be compatible with the accessibility tools which the user has already installed in the system;
- to avoid imposing barriers which make the software difficult to use by other users.

A great part of accessibility standards and elements of software testing refers to the technical aspects of accessibility. They tend to be more easily understood, measured and tested. One such example is replacing images with text, which represents an incorporation of accessibility in web pages.

For persons with disabilities the assistive technologies use recognition and text to speech systems or Braille playing in combination with software what provides information on user-interface (screen read). One category of useful assistive software users is adapted web browsers. These have as aim to present a summary of data displayed on the screen and an easier navigation through the
Internet. The new easy of access technologies make possible to develop applications which use recognition and voice synthesis, when using SAPI interface. Also, Windows Vista has added features compared to Windows XP, and the voice recognition engine (speech recognition engine) installed with the operating system and enhanced SAPI interface (version 5.3).

V. CONCLUSIONS

The European Commission works to improve accessibility of web-based services following the W3C WCAG instruction. However, according to the document Web Content Accessibility Guidelines, in 2007, only 5% of the sites and less than 3% of EU private sector were "accessible" total.

The software’s accessibility should be analyzed and implemented strictly in connection with types of disabilities. In order that the websites to be operational and effective it’s essential, especially for education.

Designing applications using assistive paradigm is important because it allows attracting new users of software, people with disabilities. In addition, assistive design is a requirement of applications to achieve certification in Windows. Continuous and fast development of information and communication technologies need to improve existing assistive technologies so that users with special needs to benefit fully from them.
BIBLIOGRAPHY


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