

Research on Web Accessibility for People with Disabilities

Summary of Findings

Prepared by Hong Kong Council of Social Service
August 2001

Background

1. As Internet develops from a text-based medium to a multi-media environment, web content has become more and more inaccessible to people with various forms of disability. This research is primarily motivated by the concern over web inaccessibility for users with disabilities in terms of webpage design and web content.
2. In view of the importance of understanding the unique experience and special needs of users with disabilities in getting access to information or services through the Internet, the Equal Opportunities Commission commissioned the Hong Kong Council of Social Service to conduct a qualitative study on web accessibility for people with disabilities.

Objectives

3. The main objectives for this research are: (1) to describe in-depth the experience in web surfing of users with disabilities; (2) to identify from their experience the barriers to obtaining information or services through the Internet for the disabled users; and (3) to identify measures conducive to making web information or services accessible to users with disabilities.

Methodology

4. General Methodology: A qualitative approach using focus group discussions, in-depth interviews and observation was adopted for this research.
5. Focus Group: Four focus group discussions were held in which informants were not only asked to share their past experience in web surfing, but also given a chance to demonstrate how they surf the web. Each demonstration usually began with loading a webpage that was suggested either by the researcher or informants themselves. Then, each informant was asked to comment on the design of the loaded webpage. During each group discussion, informants were also asked to look for some pieces of information, to download a form or program and to perform some other interactive tasks.
6. In-depth Interview: Four in-depth interviews were conducted. The format of these in-depth interviews was basically the same as that of the focus group discussions, except that there was only one informant involved in each interview.

7. Observation: Two observations were conducted because some informants who have severe mental handicap or spasm were unable to express themselves verbally. During the observations, social workers were invited to assist informants in web surfing or communicating with the researcher.
8. User Informants: Four groups of informants were involved, namely users with visual impairment, users with hearing impairment, users with physical handicap and users with mental handicap. The informants were not randomly but purposefully selected by disability concerned groups. In order to ensure that opinions and ideas were based on actual experience of informants, only users with experience and knowledge in web surfing were selected as the informants of the research.
9. Collaborative Informants: As some informants, for example, users with severe mental handicap, spasm or hearing impairment could not express themselves verbally, social workers were invited to talk about how their clients obtain information or services through the Internet.

Findings

Blind Users

10. Graphical objects or links without “alt-text” were inaccessible to blind informants as those objects could not be identified by the Power Braille or voice programs. While text-only version was not always a preferred choice for blind users, one informant who was new to the Internet considered that text-only version is easier to manage for inexperienced users. Informants expressed that they too would like to “read” the graphical objects.
11. As they read web content in a linear flow, webpages with too many frames containing different information could confuse them. The ESDLife webpage ([URL: www.esdlife.come.hk](http://www.esdlife.come.hk) visited on 13 March 2001) was an example. As the Power Braille could only show one small piece of information at a time, blind informants would not know where they were if there are too many pop-up windows or frames.
12. Poorly designed index gave another frustrating experience. Sometimes, headings used for index system was not descriptive. Users would have to guess the type of information that is imbued with a particular linkage and that increases the chances of misconnecting to webpages that are not intended to visit. The People Index in the ESDLife webpage ([URL: www.esdlife.come.hk](http://www.esdlife.come.hk) visited on 13 March 2001) is an example where the Chinese name of “魅力之都” did not tell much of the subject matter.
13. Volume of information or headings of linkage posed a problem for this group of informants too. For them, browsing a webpage required both time and good memory. It was difficult for them to browse a webpage that has too many categories of linkage or too much information because they had to memorize all categories and information before they could choose the one they want.
14. Arranging tabulated information should also be treated with care. Problems arose

when pieces of information displayed in cells of a matrix were simply treated as rows of texts and the Power Braille or the voice programs would then read the information row by row. The 5-day weather forecast tabulated on the webpage of the Hong Kong Observatory, for example, was an illustration of this shortcoming (URL: www.info.gov.hk/hko/wxinfo/currwx/f5dc.htm visited on 28 February 2001). In that case, the informants needed to reconstruct the matrix mentally by memorizing each and every row of information to obtain the targeted piece of information.

Users with Hearing Impairment

15. Audio information was by its very nature inaccessible to the informants with hearing impairment. Therefore, it is necessary to prompt them to the existence and, where necessary, the content of audio information. As demonstrated in the focus group, informants with hearing impairment were not aware of and, therefore, denied access to information presented in audio format.
16. Complicated and detailed textual information with too many technical jargons are difficult for informants with hearing impairment to understand. They said that language in textual format was not their first but second language. Providing a sign language version was suggested as an option.

Users with Partially Visual Impairment (PVI Users)

17. PVI informants were unable to distinguish texts from backgrounds using contrast of similar colors. For example, on the webpages of the Channel 1 and Channel 2 of the Commercial Radio, white text was used on light green or light brown backgrounds which created big problem for PVI informants in their browsing (URL: www.881903.com visited on 23 February 2001).
18. Informants found it difficult to adapt to constant changes of color from one page to another page in websites. Also, colored patterns such as background color or wallpaper pattern usually disturbed their reading of information.
19. Flashing graphical information or animation objects on webpages disturbed their reading. Webpages of the Ming Pao and the Commercial Radio were both found to have this problem (URL: www.mingpao.com visited on 23 February 2001). Furthermore, informants could not understand the animation presented at the beginning of the ESDLife website (visited on 23 February 2001). PVI informants commented that they could only see blurry objects moving on the screen. Blink animated that provided information and linkages would confuse them and hinder their surfing.
20. PVI informants found that it was difficult to manage changes taken place between multiple frames and in interactive windows when downloading forms. Time delay for reaction would help. Another related issue was about notices when the download was completed. For example, informants were waiting for a response of a download command in a government webpage for recruitment (URL: www.csb.gov.hk/hkgcsb/recruitment/advertisement/chinese/index.htm visited on 23 February 2001). However, they were not aware that the download was completed until they found the document on the desktop.

21. Style and colour of webpages, icons for linkages and scrolling methods should be more standardized, obvious and easy to follow. Information should be indexed properly to reduce their time and effort in going back and forth among consecutive pages. (URL: www.mpgoldenet.com/index2.htm and www.881903.com visited on 23 February 2001)

Physically Handicapped Users (PH Users)

22. PH informants on wheelchairs could not move close to the monitor. Therefore, appropriate resolution and character spacing would help them read information on the screen.
23. Small and inconspicuously located icons or buttons required more time and effort of PH informants to place the mouse pointer on.
24. Extra advertisement windows or offers of complimentary browsing tools (such as media player for multi-media information) required extra effort of PH informants to get access to the targeted information directly (URL: www.rthk.org.hk visited on 17 April 2001).
25. Unnecessary steps involved in downloading files, poor arrangement of these steps, poor operation logic of browsing procedure (URL: www.esdlife.com visited on 17 April 2001) and inconsistent positioning of buttons required extra effort of the informants. On the ESDLife website, for example, a spastic informant was required to click a button to acknowledge the opening statement of the first webpage. He needed to struggle hard to move the mouse pointer on the button.
26. Informants expressed that because their finger motion was limited, they would try to minimize chances of clicking the wrong links to avoid repeated actions. Therefore, graphical links and flashing objects should have their objective and destiny stated clearly so that PH users would not go to sites that they did not intend to visit.
27. Bookmarks/My Favourite are helpful because those features could reduce PH users' effort in typing website addresses.

Mentally Handicapped Users (MH Users)

28. MH informants coped better with familiar contents and formats. Simple and consistent design would help them surf the web.
29. Graphical objects and animation could be used as stimuli. In displaying information, sound/voice, rather than words, was found to be a better medium for MH informants to comprehend the meaning.
30. As they generally had shorter memory, links requiring good memory would not be manageable. Interactive design would help them retrieve information from their memory.
31. Large volume of complicated and poorly arranged information such as long list

of index categories or icons in one single webpage would confuse them in searching for targeted information.

Conclusion

32. As websites visited for this research were very limited, obviously, access problems identified as outlined are not exhaustive. However, they suffice to illustrate the major issues that webpage designers should be aware of when designing webpages.
33. In reviewing the access problems, due to the diverse needs of persons with disabilities in accessing to Internet information and services, it may lead to an impression that needs are contradictory. An example for this is how to balance the use of text and graphic objects where text is found to be helpful for blind users and graphic objects for people with intellectual disability. Despite of this, it is still clearly revealed from the research that **an approach of consistent and simple style** in designing web content will enhance accessibility for persons with disabilities.
34. As outlined previously, many of the web obstacles for users with disabilities can be removed conveniently by some fine-tuning or compensating strategies. For example, adding alt-text descriptions for graphical objects enable blind users to read more effectively via technical aides; good color contrast can compensate for the visual deficiency for the partially visual impaired users. Similarly, enlarging fonts or icons can solve one of the accessibility problems encountered by the physically handicapped users.
35. Some accessibility problems, however, cannot be handled merely with compensation or remedial strategies. For the users with hearing impairment or the blind users, for example, webpage designers must try to understand their particular web surfing experience in a more holistic way so that web content is designed in a way that users with disability could equally access.

List of Websites that Informants Found Difficult to Access

1. www.881903.com/main/mainpage visited on 23 February 2001
2. www.mingpao.com visited on 23 February 2001
3. www.csb.gov.hk/hkgcsb/recruitment/advertisement/chinese/index.htm visited on 23 February 2001
4. www.mpgoldenet.com/index2.htm visited on 23 February 2001
5. www.info.gov.hk/hko/wxinfo/currwx/f5dc.htm visited on 28 February 2001
6. www.esdlife.com/chi/default.asp visited on 13 March 2001
7. www.esdlife.com/chi/goto.asp?url=www.lcsd.gov.hk/CE/Library/c_index.htm visited on 29 March 2001
8. tvcity.tvb.com/index.html visited on 3 April 2001
9. www.hkatv.com/game visited on 3 April 2001
10. www.rthk.org.hk visited on 17 April 2001
11. www.esdlife.com/chi/t_n_c.asp visited on 17 April 2001

Table 1: Profile of Individual Informants Participating in this Research

<u>Type of Disability</u>	<u>Informant</u>	<u>Personal Profile</u>				
		<u>Information on Disability</u>	<u>Information about surfing web</u>			<u>Other</u>
			<u>Yrs since first use Internet</u>	<u>Frequency</u>	<u>Assistive device</u>	
Blind	Informant L	- Since birth	1 year	Once every 2 weeks	- Power Braille - ASAB 98	- Frequency restricted due to lack of assistive device
	Informant N	- Since birth	5 years	Daily	- Power Braille - Talk - Jaws & ASAB 98	
	Informant P	- Since birth	3 months	Once every 2 weeks	- Power Braille - ASAB 98	- Frequency restricted due to lack of assistive device at home
	Informant X	- Since birth	3 years	Once a week	- Power Braille - Jaws & ASAB 98	- Frequency restricted due to lack of assistive device
	Informant Z	- Since a few years ago	2 months	Twice a week	- Power Braille - Jaws & ASAB 98	
Hearing Impaired	Informant A	- No hearing, could not speak	Unknown	5 times/week	- No	
	Informant B	- Able to utter a few words	Unknown	Daily	- No	
	Informant C	- No hearing, could not speak	2-3 years	2-3 times/week	- No	
Partial Visual Impaired	Informant D	- Low vision after head injury in primary school	2-3 years	1-2 times/week	- No	
	Informant G	- Low vision since birth	2-3 years	Daily	- Magnifier	
	Informant S	- Low vision since birth	Less than 1 year	1 every 2 weeks	- Zoom Text	
	Informant Y	- Low vision since birth	2-3 years	1 every 2-3 weeks	- Zoom Text	

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		<u>Information on Disability</u>	<u>Information about surfing web</u>			<u>Other</u>
			<u>Yrs since first using Internet</u>	<u>Frequency</u>	<u>Assistive device</u>	
Physical Handicap	Informant H	- Spasm - Wheelchair user - Could not speak	3 years	Daily	- No	
	Informant M	- Could use few fingers only and has difficulties to punch keys and use mouse - Wheelchair user	About half year	Daily	- A special plastic keyboard cover for key punching	
Mental Handicap	Informant K	- Severe grade mental handicap - Word repertoire equivalent to P1	Around 1 year	Occasionally	- Touch Screen Device	- Keen on using PC
	Informant W	- Severe grade mental handicap - Intellectual ability deteriorating	Around 1 year	Occasionally	- Touch Screen Device	- Keen on using PC
	Informant E	- Severe grade mental handicap - Some physical handicap	Around 1 year	Occasionally	- Touch Screen Device	- Keen on using PC
	Informant T	- Mild grade mental handicap - Poor memory	More than 1 year	Daily	- No	- Able to express himself verbally

Table 2: Summary of Research Activities

<u>Type of Disability</u>	<u>Task</u>	<u>No. of Informants</u>
Blind	1 Focus Group	5 Informants
	1 In-depth Interview	1 Informant
Hearing Impairment ²	1 Focus Group	2 Informants
	1 In-depth Interview	1 Informant
Partial Visual Impairment	1 Focus Group	4 Informants
Physical Handicap ²	1 In-depth Interview	1 Informant
	1 Observation	1 Informant
Mental Handicap ²	1 Observation	3 Informants
	1 In-depth Interview	1 Informant

Notes:

1. An informal group discussion was held with 3 blind informants prior to focus groups to help identify the issues.
2. Extra discussion sessions held with social workers.